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T. A. RICKARD . . . . . EDITOR
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EDITORIAL.

THE IMPORTATION of Chinese is beginning to increase the output of the Rand, but not so fast as the investing public had expected. Our sympathies are with the long-suffering shareholders, who have been sorely tried during recent years, but we feel assured that their patience will be rewarded shortly. As regards the white employees at the mines of Johannesburg, it is obvious that a generous supply of unskilled labor will afford increased opportunity to the skilled workmen, and in this way the Chinaman should prove a friend to the technical profession.

REFERENCE IS made by our London Correspondent to the half-yearly reports from the leading tin mines of Cornwall, and we note that Dolcoath is barely holding its own, while the accounts from Carnbrea and Tincroft do not as yet exhibit the full effect of the important discovery made early this year. The yield of 26 lb. black tin per ton, or 1.3 per cent, indicates that, except for the new ore body, averaging 51 lb. per ton, the outlook would be most discouraging. Better returns may be expected at the close of the present half year.

THE "CENTER COUNTRY" winze from the 3,700-ft. level of the Victoria Quartz mine at Bendigo has been sunk 300 ft., so that this mine is the first in the district to reach a vertical depth of 4,000 ft. This is the deepest producing gold mine in the world.

The New Chum Railway mine, also at Bendigo, is down 3,900 ft. and has a crosscut at 3,856 ft. There are ten mines deeper than 3,000 ft. in this old Australian mining district.

AN INTERESTING coal washing plant mentioned by our Toronto correspondent is now under construction for the Dominion Coal & Coke Company, near Sydney, Cape Breton. It is intended to handle over 1,500 tons daily of mine run coal. The contractors and builders are Pittsburg men, who already have to their credit the largest coal washing plant in Pennsylvania, full details of which will appear in a further issue of the JOURNAL. The success of that plant has no doubt led to the Dominion Company's trying one modeled on

the same general lines. Some Nova Scotia coals run too high in sulphur to make good coke, but if the plant under construction proves as successful as that erected in Pennsylvania, Nova Scotia iron-masters will have little need to trouble themselves about coke supplies for a long time.

REFERRING TO the stir over the introduction of re-grinding machinery on the Rand, it is fair to say that Mr. Louis Diehl was the first to introduce tube mills into gold mining practice, this being done in December, 1899, at Kalgoorlie. Incidentally it will be well to point out that tube-mills and ball-mills possess an essential difference; the former is a long cylinder with a smooth lining in which small flints roll over each other, much as pebbles are churned by the surf on the sea coast; the ball-mill, on the other hand, is a short cylinder containing steel balls, which break the ore by sudden drops. This machine crushes, while the tube-mill grinds.

AMONG OTHER matters discussed at the Mining Congress was the recent decision of the Secretary of the Interior, interpreting the Teller law to mean that, in the survey of mineral land, the monuments on the ground govern rather than the description of the patent. As a matter of fact, this is for the courts to decide, since neither the Secretary nor anyone else, except the courts, can determine the interpretation of the law. In some cases, both monuments and description may be required to clear up errors, and, as a rule, it seems proper that monuments should hold good until proved defective. If they cover more ground than can be legally included within the location, then the locator will probably have to draw in his lines; if they cover less, it is his fault, and he should lose the area omitted. This is the usual practice with regard to real estate; and it is common sense, as well as common law.

WE NOTE that the alumni of the Massachusetts Institute of Technology have taken steps to raise a large endowment fund for their alma mater. The purpose is to place the Institute in an independent position financially and thereby check the movement for a union with Harvard. Our best wishes go to the 'Tech.' men who have won an honorable standing in the professions of mining and metallurgy and have demonstrated well enough that the Massachusetts Institute of Technology is a technical college the identity of which is worthy of preservation.

THE LARGE PURCHASE of spelter for European account, noted in our market reports last week, is an unusual transaction. For several years past our exports of spelter have been light, and practically none of it has gone to Europe. The price paid for the metal for export has not been made public; but just before it was announced—there was a sharp rise afterwards—the quotation was 4.85 cents, New York. This is equivalent, on current exchange, to £22 6s. per long ton. As the London quotation had gone up to £22 12s. 6d. for good ordinaries, there was a sufficient margin for export. The rise in price here, consequent upon this sale, does away with the margin for the time being. Spelter consumption has been large in Europe, and stocks are apparently low.

DURING THE past week two important discoveries of gold have been recorded by the daily press; the first, in the province of Iwate, in Japan, was announced in extravagant terms, but we learn that it is regarded in London as of considerable importance. Japan is not a large gold producer; in 1903 the total output only reached 79,826 ounces of fine gold, but Nippon is a country of varied mineral resources, and we shall not be surprised if this discovery in Iwate assumes considerable proportions. We have many readers in Japan, which is as progressive in mining as in war, so we trust some one of them, reading these remarks, will send us an authoritative account of the new discovery.

The other gold find came in an Associated Press dispatch from Goldfield, Nevada, where ore of extraordinary richness is alleged to have been uncovered. This will not startle the well informed, for Goldfield and its neighbor, Tonopah, are districts where the ore is nothing if not rich, but with all the uncertainties which in nature usually compensate for excessive richness. On another page we publish a timely account of Goldfield by a well-informed mining engineer, and the reading of it will make plain that rich ore is no new thing in that growing mining camp of western Nevada. It is a pleasure to chronicle this development, for Nevada has always been a great mineral region, and it is gratifying to see such a stimulus to exploration as has been afforded by recent discoveries at several localities, especially when contrasted with the depression which followed the blow to the great silver-mining districts that made the State world-famous twenty-five years ago.

WE PUBLISH an extract from Mr. Balfour's address as president of the British Association for the Advancement of Science. That a politician occupied with the perplexities of a difficult parliamentary situation should be able to prepare such a philosophic esssay is remarkable enough, even without further emphasis upon the excellence of the performance. It is a great gain to science when such an obscure subject as the theory of matter is discussed with such dialectical skill and literary charm. Recent discoveries in this most important field of research have caught the popular attention, and though the powers of radium have undergone much humorous exaggeration, and the new electric theory of matter has been sadly burlesqued, a demand has been made upon the constructive imagination of intelligent people which is bound to be of educational value. As Mr. Balfour has stated it, in words that it is a pleasure to quote: "We feel the same sort of pleasurable shock as when, from the crest of some melancholy pass, we first see far below us the sudden glories of plain, river and mountain." This admirable simile will appeal to our mining engineering friends, to whom it is often given literally to look from mountain heights to an unknown land. The realm of metaphysics may be a terra incognita to the busy men who labor at mine and mill, but an occasional glimpse of the greater world of thought beyond their daily labors may not be without a stimulus, as of a breath of air at high altitudes.

BOULDER DEEP LEVELS.

To dwell upon the salient features of the occasional fiascos which disfigure mining speculation would be undesirable if it were not for the lessons to be learnt. From the Boulder Deep Levels, a comparatively unimportant mine at Kalgoorlie, in Western Australia, sensational assay returns were sent out during the absence of the manager—then on his way to London—with the result of inflating share values; when the market collapsed an investigation was started, bringing out the facts as regards the value of the ore in certain new workings, without, however, leading to the conviction of the culprits responsible for the gross exaggeration of that value. This incident has caused widespread comment both in Western Australia, where it is recognized as having done great injury to the splendid mining business of that State, and in London, where the flagrant manipulation of the share market is regarded as a severe blow to legitimate speculation.

As soon as the facts became known the West Australian Minister for Mines instituted an enquiry which disclosed the character of the transaction without finding the perpetrators. On the top of this came the suggestion that the government should appoint an official whose duty it should be to safeguard the public by examining mines and certifying to statements concerning ore reserves. We quite agree with our distinguished contemporary, the *Australian Mining Standard*, that this is not a safe thing to do, from the standpoint of the Government itself, nor is likely to be useful as regards security to investors. In the first place, the government cannot claim the right to sample mines, and without such work any certification of estimates would be perfunctory, nor is it likely that the public service would long retain the services of an engineer of such ability and character as would cause his estimates to be considered final. Furthermore, human nature is the same, whether in or out of

government employ, and such power is too great to give to any individual without causing both financial and political complications of a very pretty kind; nor could the government undertake the task without dangers to itself, and to the State, quite out of proportion to any possible good to be accomplished.

The lessons to be derived from such episodes as Boulder Deep Levels come much nearer home to the mining profession than is indicated by the discussion of our contemporaries; the evil must be cured from within, by the profession itself, and not by the circuitous method of official paternalism. From the accounts to hand two facts are clear: First, that the managing director, Frank Gardner, ordered the mine manager to cable news to him a day before the company got it officially, and, furthermore, he instructed the manager in regard to what he should cable. In the next place, it transpires that most of the assayers and other members of the mine staff were buying and selling shares in a lively fashion. Here is explanation enough to account for all the hanky-panky which ended in such fiasco. As to Mr. Gardner's acts and notions of decency, these it is not profitable to discuss; we leave the subject to the London investing public and the misguided gentlemen who often represent them. But as regards those members of an honorable profession who sold their honor to get rich quickly, we do say that it is high time for mining engineers to recognize that speculation in shares is dangerous to professional integrity. It is useless to talk of government control, check assays, dishonest directors or any other aspect of the matter when the basic fact remains that such scandals are due nine times out of ten merely to a conflict between duty and greed, in which the latter human desire easily wins. It will be well if mining companies insist, by stipulated contract, if necessary, that the members of their staff shall not buy and sell shares of the mine in which they work. Nor do we consider that the professional men who will be thus prevented from speculating will lose much; on the whole, viewing the great number of mining engineers and metallurgists with whose careers we are familiar, it is impressed upon us that the money made by speculation has usually been lost in the same way, simply because the average professional man knows too much about mining and too little of the vagaries of the exchanges. He usually neglects his work as soon as he has caught the money fever, and in the pursuit of the shekel he often loses his judgment as an advisor and his efficiency as a technical man. All of our readers may not agree with us—especially those who think they can eke out a precarious salary by nice little winnings on the market—but, with no prejudice save a high ideal of professional integrity and with a thorough recognition of the soundness of mining shares as a speculative investment, we do hold, distinctly and without reservation, that the officials of a mine should not be permitted to buy or sell the shares of the company owning that mine, and that the company will do well to compensate this condition by paying a larger salary. There is the remedy for such scandals as Boulder Deep Levels.

PETROLEUM IN CALIFORNIA.

Notwithstanding the large increase in the petroleum production of California, the oil producers are not enjoying much prosperity just now, and it is claimed that many of them are working at a loss, or at least are making no profit. The largest and most important oil-field of the State is the Kern River district, the production of which was about 16,500,000 bbl. in 1903 for which the producers received an average of 20 cents per bbl. The Standard Oil Company has for some time controlled the output of this field, as it owned the pipe-line connecting the field with tidewater and the large centers of consumption, and also held contracts with the railroads for transportation. Now the Standard Company has notified producers in that field that it will take no more of their output except at a price of 11 2-3 cents per bbl. Most of them thought that 20 cents was low enough, and were considerably discouraged when the average price was reduced in the early part of the current year to 15 cents; nevertheless, at that price the production of the district is estimated at 15,000,0000 bbl. for the half year. Some of the large producers, such as the Associated Oil Company, have long-time contracts, and the wells controlled by the Southern Pacific Railroad Company will not be affected, as most of their production is taken by the railroads; but the independent producers, among whom are included a number of individuals and small companies, will be practically frozen out. Some of these smaller companies are operating under leases which compel them to continue work, and if they stop pumping and producing oil, their leases will be forfeited. The situation is intensified by the fact that many contracts which were made two or three years ago are now expiring, which increases the number of oil producers to whom the cut in prices will apply. This action, it is said, will also practically put a stop to prospecting and the drilling of new wells for a time. It is further hinted that an ulterior purpose of the reduction is to force as many of the smaller producers as possible to sell out their leases and abandon the field to the large operators.

The cut in the prices paid for the heavy oil of the Kern River field has been followed by another on the light oil of the Santa Maria district in Santa Barbara county, a comparatively new field, where the production is rapidly increasing. The price, which has been for some time 75 cents a barrel, has now been reduced to 40 cents. In the Los Angeles field, also, where the producers are practically all independent concerns, and where oil has been bringing a good price, running up to about 70 cents, the market has been demoralized by the introduction of Kern River oil, which was taken by pipe-line to San Francisco bay and then shipped by tank steamers to Los Angeles.

Some justification for the reduction might be found in the fact that there has really been a production of oil in excess of the current demands of the Pacific coast. There is no doubt that the Standard has supplies on hand and contracts for more, which will give it abundance of oil to meet all demands for some time to come. The production of the State for 1903 was 24,340,839 barrels, which is more than 10,000,000 barrels greater than in 1902, and this fact alone would have brought about some normal falling off in the price, although probably not so great as that now announced. The largest percentage of increase in production last year was in the Coalinga field in Fresno county, but the largest quantity came from the Kern River, Midway and McKittrick fields, in Kern county, which are generally grouped together as one district.

It is said that the producers of that district will attempt to organize, in order to control the output and to obtain prices which will enable them to exist. The success of such an organization is uncertain, however, as the pipelines are under Standard control, while railroad shipments are practically in the hands of that company and a few large producers who own the tank cars in which railroad shipments are made. The case seems a hard one, and also a very difficult one to meet.

THE COAL MINERS' STRIKE IN ALABAMA.

When the Alabama coal miners were talking strike some ten weeks ago, we pointed out that conditions in the iron trade did not warrant the coal and iron companies giving the concessions asked; that the iron companies, with the aid of convict labor, would be able to supply their fuel needs, while the demand for iron was slack, and that the miners by striking would run the risk of seeing their organization in the State utterly wrecked. Apparently, the thoughtless and hot-blooded element in the miners' union controlled its policy, for when the companies rejected the miners' demands, strikes followed. At some mines the men have now been out over two months, and officers of the union are quoted as saying that the fight is on to the finish.

The commercial coal companies, that is, those not allied with iron-making companies, have made temporary arrangements with their men, agreeing to pay wages on the basis established by the furnace companies, when the strikes are called off. Hence the railroads, steamships, householders, and most industrial plants using Alabama coal are not suffering from a fuel shortage. The principal furnace companies,

by importing coke from the Pocahontas region, and by working those of their mines employing convict labor, are able to get fuel enough and are already starting some mines with non-union labor. It is evident that so far the advantage is distinctly with the employers. The market for iron seems to show signs of revival, but as many Alabama furnaces had supplies of iron on hand when the strike was called, and as the demand for iron is hardly likely to be heavy for some time, the furnace companies lose little or nothing by idleness. On the other hand, the strikers can hardly hold out indefinitely. In spite of the strenuous talk of organizers and other officials of the United Mine Workers, it is tolerably clear that, if the iron companies maintain their present attitude for some months longer, the power of the United Mine Workers will be as thoroughly broken in the Alabama coal-fields as it has been in those of southern Colorado. For such an outcome the union will be to blame. It is not well for a man to strike when his employer is perfectly willing he should.

MARKET CONDITION.

Sept. 8.

The metal markets are generally in a more hopeful condition, and most people are looking forward to an improved fall business. In copper there is no material change in prices, and domestic producers seem to be buying only necessary supplies. The foreign demand, however, continues excellent, and buying for export is heavy.

Tin is somewhat higher, the movement being largely speculative. Lead is unchanged in price, but demand continues very good. Spelter is strong, under the influence of the large export sale, which has had an important influence upon the market.

Silver shows little or no change during the week. The demand from the East has been moderate only.

The iron and steel markets are in a somewhat uncertain condition. There is some prospect of a better business, but a good deal depends on the meetings of the various steel pools, the results of which have not been made public at this writing. It is known that there will be a reduction in billets, structural steel and plates. The situation has changed somewhat, and it seems to be now the Steel Corporation which is anxious to put down prices, while the independents would prefer to maintain them—a reversal of the former position.

The western coal markets are quiet and rather dull. Demand for steam coal is not heavy, and the lake trade is rather quiet.

The seaboard bituminous trade continues quiet, with the market rather firmer.

The anthracite trade is expected to show a revival in retail demand with the ending of the vacation season, but wholesale buying shows no increase.

THE NEW THEORY OF MATTER.*

By ARTHUR J. BALFOUR.

When the sudden appearance of some new star in the telescopic field gives notice to the astronomer that he, and, perhaps, in the whole universe, he alone, is witnessing the conflagration of a world, the tremendous forces by which this far-off tragedy is being accomplished must surely move his awe. Yet not only would the members of each separate atomic system pursue their relative course unchanged, while the atoms themselves were thus riven violently apart in flaming vapor, but the forces by which such a world is shattered are really *négligeable* compared with those by which each atom of it is held together.

In common, therefore, with all other living things, we seem to be practically concerned chiefly with the feebler forces of nature, and with energy in its least powerful manifestations. Chemical affinity and cohesion are on this theory no more than the slight residual effects of the internal electrical forces which keep the atom in being. Gravitation, though it be the shaping force which concentrates nebulæ into organized systems of suns and satellites, is trifling compared with the attractions and repulsions with which we are familiar between electrically charged bodies; while these again sink into insignificance beside the attractions and repulsions between the electric monads themselves. The irregular molecular movements which constitute heat, on which the very possibility of organic life seems absolutely to hang, and in whose transformations applied science is at present so largely concerned, cannot rival the kinetic energy stored within the molecules themselves. This prodigious mechanism seems outside the range of our immediate interests. We live, so to speak, merely on its fringe. It has for us no promise of utilitarian value. It will not drive our mills; we cannot harness it to our trains. Yet not less on that account does it stir the intellectual imagination. The starry heavens have from time immemorial moved the worship or the wonder of mankind. But if the dust beneath our feet be indeed compounded of innumerable systems, whose elements are ever in the most rapid motion, yet retain through uncounted ages their equilibrium unshaken, we can hardly deny that the marvels we directly see are not more worthy of admiration than those which recent discoveries have enabled us dimly to surmise.

Now, whether the main outlines of the world-picture which I have just imperfectly presented to you be destined to survive, or whether in their turn they are to be obliterated by some new drawing on the scientific palimpsest, all will, I think, admit that so bold an attempt to unify physical nature excites feelings of the most acute intellectual gratification. The satisfaction it gives is almost esthetic in its intensity and quality. We feel the same sort of pleasurable shock as when from the crest of some melancholy pass we first see far below us the sudden glories of plain, river and mountain. Whether this vehement sentiment in favor of a simple universe has any theoretical justification I will not venture to pronounce. There is no *a priori* reason that I know of for expecting that the material world should be a modification of a single medium, rather than a composite structure built out of sixty or seventy elementary substances, eternal and eternally different. Why, then, should we feel content with the first hypothesis and not with the second? Yet so it is. Men of science have always been restive under the multiplication of entities. They have eagerly noted any sign that the chemical atom was composite, and that the different chemical elements had a common origin. Nor, for my part, do I think such instincts should be ignored. John Mill, if I rightly remember, was contemptuous of those who saw any difficulty in accepting the doctrine of "action at a distance." So far as observation and experiment can tell us, bodies *do* actually influence each other at a distance. And why should they not? Why seek to go behind experience in obedience to some *a priori* sentiment for which no argument can be adduced? So reasoned Mill, and to his reasoning I have no reply. Nevertheless, we cannot forget that it was to Faraday's obstinate disbelief in "action at a distance" that we owe some of the crucial discoveries on which both our electric industries and the electric theory of matter are ultimately founded; while at this very moment physicists, however baffled in the quest for an explanation of gravity, refuse altogether to content themselves with the belief, so satisfying to Mill, that it is a simple and inexplicable property of masses acting on each other across space.

These obscure intimations about the nature of reality deserve, I think, more attention than has yet been given to them. That they exist is certain; that they modify the indifferent impartiality of pure empiricism can hardly be denied. The common notion that he who would search out the secrets of nature must humbly wait on experience, obedient to its slightest hint, is but partly true. This may be his ordinary attitude; but now and again it happens that observation and experiment are not treated as guides to be meekly followed, but as witnesses to be broken down in cross-examination. Their plain message is disbelieved, and the investigating judge does not pause until a confession in harmony with his preconceived ideas has, if possible, been wrung from their reluctant evidence.

* Being part of the address of the President of the British Association for the Advancement of Science, Cambridge, 1904.

By operating 880 stamps an average of 348.5 days last year, the nine deep-level mining companies of the Rand Mines, Ltd., milled 4,429 tons ore daily—5.03 tons per stamp—at a cost of 69c. per ton.

Japanese copper, of which 1,609 tons were imported into America last year, frequently contains from 25 to 200 oz. silver per ton, and sometimes up to 5 oz. gold.

Tubes and other hollow articles for chemical work are now being made from pulverized quartz in the electric furnace. Their good qualities are an exceedingly small co-efficient of expansion, high melting point, and great resistance against sudden temperature changes.

The Federated Malay States produced 436,369 piculs, or 25,697 tons of tin and tin ore during 1903, as compared to 30,492 piculs in 1902, which was the record up to that year. Tin exports during 1903 were valued at $35,873,208, on which an export duty of $5,067,411 was paid.

In one ton of coal there is as much energy, as much actual work, as may be done by 40,000 good laborers in a 10-hour day. The steam engines utilize only one-tenth of this energy at the present time, but even now the cost of the most unskilled work done by man is one thousand times the cost of the same work done by the best steam engines.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of the ENGINEERING AND MINING JOURNAL.

PROPOSED AMENDMENT OF THE MINING LAW.

The Editor:

Sir.—I am glad to see in your issue of August 25 that Mr. E. E. Chase, of Denver, has taken up the question of amending the mining law. I hope that others, as thoroughly competent as Mr. Chase, will take up the subject and evolve the most efficient remedy. Mr. Chase's suggestion that the end-lines, staked as such, should always be the end-lines, will help matters considerably; but boundaries following the line of true dip, if applied to his own diagrams, illustrate that my suggestion would do better equity, and divide the entire vein according to the length located by each claim. The matter of establishing the line of true dip does not seem so difficult to me as it appears to Mr. Chase. One engineer employed by each owner, these two selecting a third as umpire, and all three acting as final arbitrators, will easily solve the problem.

Mr. Chase's remark that my concluding sentence contradicts the argument of my article is correct. But that is entirely the fault of the (omniscient) editor of the ENGINEERING AND MINING JOURNAL, who used his blue pencil too freely. The sentence referred to should read as follows, "Because, at a first glance, it appears desirable, beyond everything else, that boundaries should be fixed by permanent end-lines."

MAX BOEHMER.

Denver, Aug. 30, 1904.

(Mr. Boehmer makes a pardonable error. The editing he refers to was done by Dr. R. W. Raymond, the article having been submitted by the author to the Secretary of the Institute before we had the pleasure of publishing it in this Journal.—EDITOR.

WORDS AND THEIR WAYS.

The Editor:

Sir.—The comments of Mr. John Seward, in your issue of June 9, on the careless use of mining terms are well illustrated at the St. Louis Exposition. The Colorado gold mine exhibit at the Fair issues a program, upon the back of which is a glossary of 44 mining terms. More than one-half of these terms are improperly defined, and in most cases absolutely wrong. There is no necessity for this corruption, and it is only to be explained on the ground that those who used the terms did not understand them. Dr. R. W. Raymond pub lished as long ago as 1880 a 'Glossary of Mining Terms,' and this is almost standard. The 'Standard Dictionary' is also an authority on mining terms, and as the 'Coal and Metal Miners' Pocket Glossary' has been compiled from these and other sources, it may be also considered authoritative.

There will be more than one meaning for some words, but it is hardly necessary to have four or five words that have been borrowed from England or her colonies to express the same thing. It will be difficult now to weed out the Cornish terms that have been absorbed, and the wrong technical terms with which courts and lawyers have corrupted our language. Take the word 'adit,' that Mr. Seward says he has heard defined as a drift. The definition he quotes is taken from Dr. Raymond's glossary and is standard, yet Mr. Seward is not wrong, for if an adit be driven in an ore deposit it is termed a 'drift,' but it is immaterial as far as the definition goes whether the excavation is made in ore or in country rock toward ore, since an adit is an underground excavation for access, transportation and drainage. As a tunnel will perform the same functions, an adit has been wrongly termed a tunnel by lawyers corrupting the latter word, which is defined in civil engineering as an excavation that passes through a hill. The words 'raise,' 'upraise,' 'rise' and 'riser' are synonomous. The first two could be eliminated from mining without endangering the integrity of the English language. Possibly the words that express mineral deposits show the most confusion, for which reason the writer adopted the following definitions:

Vein.—Any fissure in rock that has been filled with mineral matter.

Seam.—A stratified rock deposit.

Bed.—A stratified rock deposit.

Lead.—An objectionable term for lode.

Lode.—A somewhat continuous, unstratified metal-bearing deposit.

Ledge.—A somewhat continuous, stratified metal-bearing deposit.

Reef.—An Australian term which has a wide and varying application. It is defined as lode, ledge or vein. If made synonomous with ledge, it will cover the Appalachian and Californian auriferous slates, and the Transvaal banket.

Dr. Raymond, in writing on Tunnel Rights (see 'Mineral Industry,' Vol. VI., page 685), says: "The hand that could write *apex*, meaning not a point nor a line but the total thickness or cross area of a vein nearest the surface, and could describe the *extending* or horizontal surface lines *downward vertically* was quite competent to label a cross adit *tunnel*." Of course, he had reference to a lawyer, thereby furnishing another clue to the careless use of mining terms. In the 'Eighth Biennial Report' of Bureau of Agriculture, Labor and Industry of Montana there are some mining terms defined wrongly by a lawyer. A few gems from these are quoted for the benefit of Mr. Seward and others, that they may know that mining engineers are not responsible for the corruption and jumble of definitions which occur owing to the ignorance of would-be mining men and lawyers.

Quartz Mines.—"This class embraces those deposits in which the mineral is found in the condition and position in which it is supposed to have been deposited, and appear enclosed in fissures, crevices and seams in the natural rock." A little reflection will convince the most skeptical that the man who wrote this definition was fluent, and besides could not tell the difference between a mine and a deposit.

Fissure Veins.—"These veins are formed in openings, rents, breaks, fissures, or ruptures in the earth's crust." "These openings are found filled with what is known as the vein, lead or lode, and vein or lode matter." The lawyer inadvertently omitted the words bust, hole and vacuum, and we think he should have used the word truss. However, compensation is made for this neglect by the clause "openings are found filled," and the definition given for vein later.

Dip.—"The dip of a vein is its departure from the perpendicular on its descent into the earth." This definition is explained as follows: The dip of the vein is the hypothenuse of a right angle triangle, that has one side perpendicular to the hade, and the hade perpendicular to the side that is perpendicular to the hade.

Course of Strike.—"The course of strike of a vein is the length of the fissure, or vein, running with the surface of the earth." We called these definitions gems, but this one may be called quicksilver, from the way it runs.

Talc.—"Talc is the selvage or material found along each wall of the vein." We differ from the lawyer in regard to the definition for talc.

Ore.—"Ore is a term designating such parts of the veins as are mineralized." As all veins are mineralized, and all ores are not necessarily metallic, the proper definition for ore is "any mineral that may be mined and treated at a profit."

Vein or Lode.—"Vein or lode is a body of mineral or mineral-bearing rock within defined boundaries in a general mass of the mountain." This definition makes anything in the rock line a vein.

In Place.—"It is required that the vein or lode be in the general mass of the mountain. It cannot be on its surface or covered by movable parts called slides and debris, but if it is in the general mass of the mountain, although the enclosing rocks may have sustained fractures and dislocations in the general movement of the mass, it is still in place." This last definition is a pearl, so to speak, and might have been summed up in the few words: "A deposit in its original position is in place."

EUGENE B. WILSON.

Scranton, Pa., Aug. 31, 1904.

NO LIABILITY COMPANIES.

The Editor:

Sir.—In your discussion on mining finance it may not be out of place to consider the question of the "no liability" company as practised in Australia. This system is not well known in the United States, and as it is resorted to so largely in a country whose gold output was last year the largest in the world, it is certainly worthy of consideration. The reason that the "no liability" company has such a popularity in Australia is that, exclusive of Western Australia, the mines are opened and supported almost entirely by local capital, the shares being held mostly in small blocks. Nearly every miner, and a large proportion of the outside public, speculate in mining shares. Local capitalists, not being strong enough to underwrite or finance large undertakings, and with a desire to retain the control of the mines in the country, the "no liability" company has sprung into existence, until to-day it is an inseparable feature of Australian mining practice.

Previous to the introduction of this class of organization the limited liability company was the method of flotation adopted; but including, as it did, among its shareholders a great number of miners and others with limited means, when a large "call" was made at one time, the poorer shareholders would often be unable to meet it, and cases have occurred where individuals have been thrown into bankruptcy on account of their share liability. In contrast to this, in a liability company, a person buying shares on which only a fraction of the nominal value has been called up, assumes no liability to meet any future calls. He can drop out any time he sees fit, and in the case of non-payment, usually after the lapse of one month, the shares are sold at auction on the Stock Exchange, after notice of the sale has been duly advertised in the local papers. The no liability company has been the means of producing a large

amount of gold, but it has many weak points, among the chief of which is the fact that it increases the speculative element in mining investment, and it is the earnest desire of every engineer to reduce the speculative element in mining as much as possible.

One writer would have 80 per cent of the share value of a mine in sight as profits before considering it a good investment, and though that is a consummation devoutly to be wished, yet from the engineer's viewpoint it is manifestly asking too much. This method would require only a sampler and assayer to determine the value of a mine, but every day the examining engineer is called upon to pass judgment on propositions that could not comply with the 80 per cent condition.

Every proposition we investigate is not a big one and, to condemn wholesale all prospects we come across would require very little of what we may call mining intuition. By prospects as here used, I include properties from which a considerable amount of ore may have been taken, but which have little or no ore in sight. This, then, brings in the legitimate element of speculation, which aspect the engineer can never separate from mining, and with which he must always reckon. In many cases this is quite large enough, without endangering the success of the enterprise by forming a no liability company, often with an entirely inadequate capital; the amounts secured by each separate call being so small that economical methods cannot be adopted, as the funds do not allow of any scope in planning the work. I do not for a moment mean to imply that all no liability companies are crippled through this sort of policy, because such is not the case; but a great deal of this hand-to-mouth policy does exist.

The philosophy, then, of the call system is based on the very thing the engineer seeks to eliminate, namely, the element of speculation. A company is formed to work a property. Let us follow the method pursued by a small one of, say, £10,000 nominal capital in £1 shares. One or two shillings may be required with the subscription, and then 3d. per month per share is called; this brings in £125 per month. All work will be carried out in the most slipshod manner, to make the money go as far as possible at the particular moment, with the hope that the mine will soon be able to pay its way. It is true, many people have put money into mines on this sort of a basis who would not on any other, miners making £2 per week owning and paying calls on small blocks of shares. These small holdings, no doubt, aggregate considerable sums and constitute an important percentage of the total capital invested in mines in this part of the world, and, too, they materially support the industry; yet with a proper working capital in the beginning at the disposal of a competent man, a great deal more could be done with the same cash, and therefore with the greater chance of success.

Another great objection to the no liability company is the ease with which it lends itself to the ends of the dishonest company promoter. In the limited liability company the larger sums required are apt to cause a closer investigation into the merits of a property; whereas in the no liability company, as the payments are intermittent and smaller, not as much felt by the investor, he is willing to take a bigger risk, because, he argues, he can drop out at any time, and he often goes into a company much as he would put up money on a horse race. Once in, glowing reports from the mine keep him paying calls, until often he has a considerable sum invested, and then continues, because he has already so much at stake. Taking advantage of this weakness of human nature, the dishonest promoter gets one or more exceedingly favorable reports from a certain class of mining quack and, with these as a basis, he solicits subscriptions. The owner is to be paid, perhaps, a certain amount of cash, in case of flotation; the promoter reserves for himself a sufficient number of shares, issued as fully paid, and the rest are offered to the public. Naturally, attempts are made to create an artificial value in the shares, by issuing glowing reports from the mine, and by whatever other means are at hand. Once a demand for shares is created, out goes the promoter, although, as his shares are fully paid up, he may find it to his advantage to hold on for a considerable length of time, as the more money paid in calls, other things being equal, the more valuable his own holdings become.

Despite all its handicaps, the no liability company continues, and will continue to exist in Australia, as it affords the working miner and small capitalist an opportunity of making a stake, and in many other ways suits the conditions of the country. It must be borne in mind that, to a very large extent, the ores are free milling, and can be treated in comparatively inexpensive plants, so that, as soon as the pay-shoot is encountered, the property can begin to pay its way without the necessity of having to plan a special metallurgical plant.

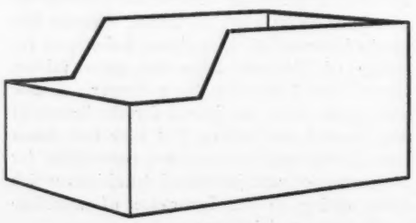
C. S. HERZIG.

Melbourne, July 25, 1904.

A SAMPLE BOX.

The Editor:

Sir.—In submitting to you the accompanying sketch, I believe that mining engineers will find it a valuable suggestion to the safe and easy



SAMPLING BOX.

sampling of a mine. The danger of accidental salting in the use of a canvas to catch the sample, and the physical difficulty of employing it in a great many cases has been fully discussed in the JOURNAL.

I agree fully with the eminent engineers who advocate the use of a small box to catch the sample. If my suggestion is any improvement, I shall be glad to see it in universal use. By reference to the sketch it will be seen that the box can be held up very close to the cutting tool, thus arresting many of the flying particles which would otherwise escape. I believe that this device will assist in giving a better sample than either the ordinary box or canvas.

CHARLES E. ROWE.

Denver, Colo., Sept. 1, 1904.

against 571,660,042 lb. in the corresponding period of 1903, a decrease of 354,411,114 lb., or 62 per cent. Of the imports this year, 116,481,022 lb. came from Germany; 81,135,082 lb. from Belgium; 10,534,355 lb. from France; 6,214,856 lb. from Great Britain; the balance, in small lots, from other countries.

CEMENT IMPORTS.—The imports of cement into the United States for the seven months ending July 31 were 217,248,928 lb.,

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CEMENT INDUSTRY IN NEW SOUTH WALES.—The cement industry in the Portland district, in New South Wales, is reported to be flourishing. The Commonwealth Portland Cement Company is running full time, and the recently added cement mill is in full swing. The Great Western Lime Company has fairly started operations, and despatched its first consignment recently.

FLUORSPAR.—According to Mr. H. Foster Bain, in 'Bulletin 225' of the United States Geological Survey, the Kentucky-Illinois district is not only the main American source of fluorspar, but is the only one from which it reaches the general market. Since 1882 the district has produced 218,135 tons of spar, of a total value of $1,309,469. The spar is shipped in part by the Illinois Central Railroad and in part by the Ohio river. At Pittsburg the American spar comes into competition with English and German material imported through New York. The American mines supply the Western trade and about half of the Pittsburg demand. The importers control the Eastern trade and determine prices at Pittsburg.

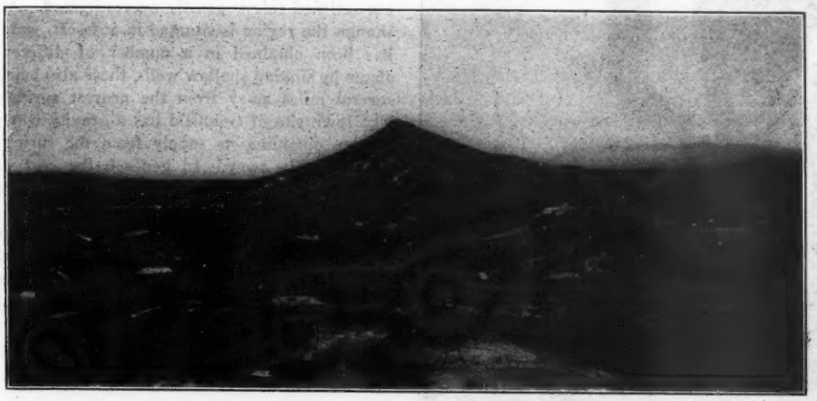
MINOR MINERALS IN AUSTRALIA.—The *Australia Mining Standard* says that among the minor minerals that occur in Queensland are ores of bismuth, molybdenum, manganese, quicksilver, wolfram, and gems, as opals and sapphires. In New South Wales we find baryta, bismuth, alum-stone, chromite, antimony, cobalt, graphite, molybdenum, quicksilver, talc, tripolite, platinum, wolfram, and among the gems, diamonds, emeralds, opals and turquoise. In Victoria are found antimony, bismuth, magnesite, monazite, and tripolite. South Australia produces gypsum, salt, mica, phosphate of lime and precious tourmaline. Tasmania is, for its size, perhaps the most prolific State of all in the variety of its mineral products, among which are to be found bismuth, nickel, osmiridium, and wolfram.

NICKEL IN AUSTRALIA.—The *Australian Mining Standard* says: "Nickel has been found among the Australasian States only in Queensland and Tasmania. In the State first-named it has been identified as a rare occurrence of scientific interest, but of no economic value. In Tasmania, the known deposits of nickel ore are on a larger scale, and in 1894 exports were 136 tons. The locality of Trial Harbor, on the west coast, to the north of Macquarie Harbor, is that from which it was obtained, and recent prospecting near the old Meteor mine has led to the discovery of nickel ore in workable quantity. Mr. J. G. A. Sitt has proved it to be the width of a shaft sunk from the surface to the level of one of the tunnels driven some years ago for asbestos. He has raised about four tons of a pyritic ore, which he finds fairly rich in nickel, and proposes to further test it by driving, and also by sinking below the adit level. Beyond what has been done in Tasmania, no attempts have been made to systematically prosecute the search for this valuable metal."

THE DISTRICT OF GOLDFIELD, NEVADA.

By Marshall D. Draper.

This mining camp presents an extraordinary record, few, if any, districts in the West having produced such an amount of high-grade ore in so short a time with so little equipment and development. Goldfield is situated on the desert of western Nevada, 25 miles south of Tonopah; it is a surprising fact that over $700,000 worth of ore has been marketed in a little over seven months, and this has been done despite such drawbacks as a long wagon haul through Tonopah to the railroad, with inevitable high prices for materials, and a general lack of water.



GOLDFIELD, NEVADA.

Within the last few months conditions have changed materially; a town has been built, several mines have been opened up, and a water system, from springs about a mile away, has been installed to furnish the town, which now has about 500 residents. The railroad has just been finished to Tonopah—thereby reducing the former expensive wagon haul—and it will probably be extended to Goldfield shortly. Two daily stage lines run from Tonopah to Goldfield. The town now has accommodations in the way of restaurants, lodging-houses, stores, etc.

The district comprises an area of about ten miles long, by three or four miles wide, Goldfield itself lying near the center of the western side, while the town site of Diamondfield, about three miles away, is in the center of the northern half of the district.

The local geology is not so complex as that of Tonopah, and differs materially from it in exhibiting far less faulting, and also in the absence of such a capping of eruptive rock as covers the apex of the veins of Tonopah.

In general, the topography is dominated by rolling hills, with occasional higher buttes. Within this area, which seems to be the center of the greatest activity, there have occurred several successive depositions or flows of andesite (and more locally, rhyolite) finally capped by basalt. The latter is comparatively thin and is spread over a much greater area, but it has been largely eroded, leaving only remnants; good examples of this occurrence being afforded by the two lava-capped buttes about a mile southeast of Goldfield. Further south, instances were noted where this rock was more basic, approaching a peridotite; elsewhere also, the rock contained large phenocrysts of hornblende and olivine, giving a porphyritic habit. This formation is later than the veins and it has evidently no connection with the ore deposits.

Erosion of this capping basalt and the underlying porphyries affords illustrations of the flow structure of the porphyries and their approximately horizontal deposition. On the south end of Columbia mountain this may be seen, where the porphyries lie slightly tilted, showing the stratification, or rather flow-lines, dipping toward the east or southeast. At this point they rest directly on a comparatively coarse-granitic rock which outcrops on the west side of the mountain. This granite rock, through its scarcity of muscovite or biotite and somewhat pegmatitic structure, is probably the 'alaskite' mentioned in the notes of Mr. J. E. Spurr. The occurrence of this rock was not noted elsewhere in the district, and at this place it seemed to possess more the characteristics of an old plutonic rock, rather than a successor, or even a contemporary, of the porphyries.

Unless the porphyries occupy a basin in the granite in a manner similar to the Cripple Creek occurrence, it would seem from the dip of the layers that the granite will be encountered in depth, in the January and Red Top, and perhaps in the neighboring mines also. From the limited data obtainable, the minimum depth at which the granite may be expected in the Red Top shaft is 1,500 ft. I quote this in the light of an interesting possibility rather than a probability, because, from the fact that the granite outcrops only in one other place some five miles to the southwest and outside of the mineral bearing area, it might be predicated that none of the mines so far opened will encounter the granite at any ordinary depth. Shafts sunk on the western slope of the ridge of Columbia mountain (where considerable high-grade 'float' has been found) may, however, strike the granite within 800 or 1,000 ft. Such expectation may be eliminated entirely from the future operations of mines lying further east and south, such as the Jumbo, St. Ives, Florence, and others.

JANUARY MINE.

In general, the trend of the veins is southwest and northwest. The January vein, however, seems to sweep around in almost a quarter circle, drifting and stoping on the vein having been done in sufficient amount to prove this fact over a distance along the vein of about 300 ft. So far, almost all of the ore that has been shipped has been oxidized, although quite recently one of the producing properties has encountered sulphides and, as in the case of the preceding mines, values have been maintained to a remarkable extent, so as to remove that bugbear of all new camps: "Have they struck sulphides yet?" and "Do they run?"

The character of the ore is distinctly siliceous, and from the low proportion of iron oxide in the gossan and small amount of sulphides found in the ore below the oxidized zone, it would seem safe to say that as a whole, the unoxidized ore carries about three to five per cent sulphides. The constituents of the ore, besides the quartz, seem to be little else than pyrite, with occasional copper either as chalcopyrite or as gray copper, the latter chiefly. Occasionally, small amounts of marcasite are noted also. Gypsum occurs in two or three places in notable quantities as vein filling. It may be seen in interstices of the porphyry in the January mine and in the Mohawk, where it is a secondary deposit cementing gossan and rock breccia near the surface of the ground.

An interesting and important feature is the occurrence throughout the district of what may be called quartz or quartzite 'dikes.' These large masses of quartz, having resisted erosion more than the surrounding andesite, outcrop often along the low ridges or knolls, and are very conspicuous. They vary in width from three or four to 40 ft. and average roughly 15 ft. Examined closely, they are seen to consist of massive quartz, granular, and somewhat resembling quartzite in some instances, often brecciated and closely re-cemented by silica, and less frequently composed of more or less silicified porphyry.

In the commercial sense, these are not the veins of the district because, while in many cases they contain the pay ore, they are them-

selves practically barren. They seem, then, to have been two phases of ore formation; first, the formation of the dikes, which might easily be accounted for by the deposition of large quantities of gelatinous silica; second, a later deposition of ore in secondary fracturing and shearing, along lines of weakness determined by the course of the dikes. The proof of the second stage of this deposition seems to be evident, as in all cases noted the ore was in

JOSHUA TREE—OUTCROP OF DIKES IN BACKGROUND.

brecciated or vesicular quartz entirely dissimilar from the character of the quartz composing the dikes, in addition to containing the common vein minerals which are absent in the dikes. Other indications also are apparent, such as the presence of gouge or 'talc' on the walls, which are well defined. The dikes themselves, on the other hand, generally lack walls, evidently owing to intense silicification of the adjacent rock; the gradation from dike to country rock being manifest. Though, as stated, the dikes proper are not the veins, there are, as might be expected, instances where mineralization has extended entirely through their limits, thus making very large bodies of ore. There is no doubt that while most of the veins have been formed within, or near, the dikes mentioned, a number exist wholly uninfluenced by their proximity. The January and O. K. Fraction veins seem to be of this class.

The particular characteristic for which Goldfield is noteworthy is not only the richness of the ore, but the amount produced from limited development. The January shaft is down about 200 ft. and has shipped continuously since its discovery, ore valued at $200 per ton. The Combination mine, also down about the same depth, has shipped continuously ore, the minimum value of which has been $250 per ton. The Jumbo is about 150 ft. deep in the deepest lease (of which there are about eight along the vein, about 100 ft. apart), and all of the leases are shipping continuously ore of a very high grade. On the Vermilyea lease one of the owners pounded out in a small hand mortar with a pestle hung on a spring-pole, $5,000 in one day. Eighteen inches in width in another lease ran $15,000 per ton. Other instances may be quoted, thus, an 80-ton shipment from the Florence mine, down now a little over 100 ft. netted $57,000; or an average of over $700 per ton. Two feet in width on a recent discovery on the Vernal No. 2 ran $750 per ton. "Picture assays" are, of course, common.

From reliable sources the production since February 1, 1904, was:

January mine	$200,000
Combination mine	200,000
Jumbo leases	150,000
Florence mine	150,000
Total	$700,000

About ten other properties are saving ore and will ship within the next 60 days, among these being a number of leases on the St. Ives, the O. K. Fraction, Red Top, Vernal, Daisy and Velvet. It is fair to assume on the present basis of production that within a year from the time of starting work in the camp (January of this year) the output will be in the neighborhood of $1,500,000. Naturally, only high-grade ore is being shipped now, owners in general aiming to send out nothing less than $200 ore, owing to high tariffs for freight and hauling. On this account much low-grade ore is left on the dump and it is safe to estimate this ore at about $250,000. Of course most of the poorer rock is left in the stopes, and as the veins are invariably wide and strong, this asset will eventually be realized. Instances of this are noteworthy in the January and Red Top. The former has 35 ft. in width in one place of good ore, that is to say, $20 or more in value, and the latter has crosscut the deposit for a distance of over 125 ft.; for a large part of this distance the rock is said to assay $10 per ton.

Some of the lower grade surface ore has been milled, but the results obtained by amalgamation were disappointing. It is probable that the scheme of treatment will involve concentration, with cyanidation of the resultant tailings, or else chlorination direct. It has been stated that the sulphide ores show tellurides, but a qualitative test on some representative mineral failed to show any tellurium.

Some difficulty has been anticipated in regard to obtaining water for milling purposes, but I am satisfied this is greatly overestimated. Although the region is situated in a desert, water has been obtained in a number of different places by sinking shallow wells, these also being several miles away from the nearest springs. The town site of Goldfield has a gravity water system, obtaining its supply from the springs about a mile away. In general, the cost of water should not exceed 15c. per ton of ore treated.

The district is reached by railroad by Reno, Nevada, to Sodaville, south from Reno some 200 miles, thence about 60 miles on another line to Tonapah, and finally 25 miles south of Tonopah by daily stage to Goldfield.

TRADE SCHOOLS IN THE PHILIPPINES.—The *Far Eastern Review*, of Manila, says: "Dr. Barrow's plan for the establishment of trade schools throughout the islands should meet with the hearty support of all classes. If we are to educate the Filipinos, and hold the islands for their benefit, it is only just that they be given every advantage to avail themselves of the opportunities offered by the development of the country.

"It is an admitted fact that American skilled labor cannot be induced to come to the tropics, and we have set up a wall against the importation of Chinese mechanics. Development schemes of great magnitude are being planned by official and private enterprise, and sooner or later the all-absorbing question of skilled labor is bound to come to the front. It is hardly probable that the proposed schools will be able to turn out sufficient mechanics to fill the ever increasing demand, but they will do their share, and the fault will be with the natives if they do not avail themselves of the opportunity offered. The Filipino is an apt scholar, and takes quickly to certain lines of work. Some of the finest tracings of mechanical drawings are turned out by these people."

TONOPAH, NEVADA.

THE QUICKSILVER DEPOSITS OF CALIFORNIA.

BY WILLIAM FORSTNER.

The writer has spent nearly a year examining the quicksilver deposits of California for the State Mining Bureau, and during this examination questions have arisen in his mind, which he desires to put in print, in the hope that some one more competent may offer a solution.

While the subject of the genesis of ore deposits has been exhaustively discussed during the last decade, quicksilver deposits have received but scanty attention; and when mentioned they are referred to as resembling in character and genesis the deposits of gold ore.

The principal papers[1] dealing with the genesis of quicksilver ores date back several years, at a time when the theory of the formation of ore by precipitation out of solutions, the result of exclusively aqueous action, held full sway. Gradually the conception of ore-deposition is broadening, and instead of being considered a result of aqueous action alone, it is held to be due, in part at least, to aqueous-igneous agencies.[2]

Quicksilver ores are found associated with all the chief metallic ores, but except with iron sulphide, this association is only local and sporadic. Pyrite, however, is generally, if not universally, associated with cinnabar, and invariably with meta-cinnabarite. Traces of copper sulphide are found frequently; arsenical and antimonial compounds occur abundantly in some deposits, and gold exists occasionally intimately associated with cinnabar.[3]

The association of cinnabar with antimony and copper is well illustrated in the Hayton mining district, San Benito and Merced counties. The Manzanita mine, Colusa county, is generally mentioned as an illustration of the intimate association of cinnabar and gold.[4] The mineralization can be separated into two distinct zones, one carrying gold with some cinnabar, the other carrying cinnabar without any appreciable gold content. The same relation exists to a certain extent between the cinnabar and the stibnite in the Hayton mining district; neither is the cinnabar intimately mixed with the copper sulphide.

I cannot agree with Mr. Becker that in the Manzanita mine cinnabar and gold may have been deposited in notable quantity from the same solutions. It appears to me more probable that the deposition of the mercurial ores was posterior to that of the gold ores. Such sequence can often be observed in the relation of cinnabar and pyrite. In many mines the coating of pyrite by cinnabar and meta-cinnabarite is clearly illustrated, as in the so-called "strawberry ore." Samples of such ores are found in the museum of the California State Mining Bureau, from the New Idria mine in San Benito county, the Grayson (Summit) mine in Stanislaus county, and the Baker mine in Lake county.

In his description of the Mercur mine, Utah, Mr. Spurr[5] states: "The distribution and general habit of the pyrite support the belief that the iron was not introduced in the rock at the time of mineralization, but existed therein formerly, and was transformed into sulphides at the time of mineralization." Sandberger[6] describes the quicksilver ores of the Huitzuco district, Guerrero, Mexico, as a pseudomorph of cinnabar after stibnite; clearly indicating that the formation of the former was posterior to that of the stibnite. Mr. Becker[7] states: "Microscopical examination shows that while pyrite is frequently directly embedded in the opal . . . no case was found in which cinnabar was directly embedded in opal. The black opal . . . seems here, and elsewhere, to have preceded ore deposition by a short interval." In fact, quicksilver differs so greatly in its physico-thermal characteristics and in its chemical behavior from all other metals, that it cannot be readily conceived how quicksilver minerals could be formed simultaneously with those of most other metals except under exceptional circumstances.

Quicksilver differs in many characteristics from gold. In whatever form gold may be carried it is precipitated either as a telluride, or as metallic gold associated with tellurides and sulphides. Whether gold is precipitated in nature as a sulphide, is as yet an open question. At all events sulphide of gold is an unstable compound, while sulphide of mercury, on the contrary, is stable, without any oxidation products in the zone of weathering. The combinations of mercury with other elements, while occurring in nature, are rare; they are formed mostly with tellurium and selenium, elements belonging to the same family as sulphur. Le Conte[8] seemed inclined to consider that the original forms of the metallic sulphides were silicates, which passed through many changes, as carbonates, sulphates, etc., into sulphides, to be subsequently again changed into sulphates, etc. As no silicate of mercury has yet been observed in nature, we can leave this compound out of consideration.

Mercuric sulphide is not found intimately associated with the sulphides of lead, zinc, and iron, as is the sulphide of silver; neither does it form sulph-antimonous or sulph-arsenious salts, or chlorides, in the zone of oxidation. Quicksilver differs also materially from all other metals in its behavior toward heat; it becomes solid at 39.5° C. and boils at 357° C., vaporizing to a certain extent at ordinary temperatures. Professor Schrauf has shown that mercuric sulphide volatilizes in laboratory experiments at about 237° C., and probably at a much lower temperature in nature[9]; hence at temperatures which undoubtedly often obtain at no great depths in regions which have been subjected to igneous intrusions, and where slowly cooling magmas may be considered to exist at no great depths below the surface. The investigation, just referred to, into the genesis of quicksilver ores may be summarized as follows: The solubility of mercuric sulphide in the form of a double salt of the formula HgS, *n* Na_2S in solutions containing alkaline compounds in the presence of sulphur, is an established fact; and as mercuric sulphide is produced when in a solution of a mercuric salt hydrogen sulphide is added, the formation of such a soluble double salt in solfataric water and the transportation of the mercuric compound is readily explained. The mercuric sulphide is precipitated from those solutions by decrease of temperature and pressure, by dilution or cooling of the depositing water, or by the addition of agents causing super-saturation of the solutions. When the temperature and pressure gradually decrease the precipitate assumes the crystalline form, cinnabar; when the precipitation is sudden amorphous mercuric sulphide, meta-cinnabarite, and a small quantity of native mercury, are thrown down.

The formation of mercurial sulpho-salts and their solution in the circulating waters must evidently, to a great extent, take place in the lower physico-chemical zone, in which sulphur is the predominantly active agent.[10]

As already mentioned, indications are found in many deposits, suggesting that the mercurial minerals have not been deposited simultaneously with the other metallic minerals which may be present. The vertical extent of quicksilver ores is also limited; that is, at a relatively limited depth their content of quicksilver becomes so low that further exploitation is no longer remunerative. As a general rule the approach of this zone of impoverishment is indicated by the appearance of native mercury; and this is so generally the case in California that the experienced miners regard a mine showing any quantity of native mercury with great disfavor.

Quicksilver deposits are undoubtedly related to igneous phenomena; this relation can be traced in California either by direct evidence or by solfataric action. If these deposits, in the form in which we find them at present, are formed exclusively by precipitation of mercuric sulphide from solutions, wherein it existed in the form of the double sulpho-salt, HgS, *n* Na_2S, the question arises, how to explain the almost uniform presence of native mercury at, or near, the bottom of the deposit, or to be more correct, at, or near, the level where a decisive impoverishment of the metallic content takes place.

As was stated above, the experiments made on the behavior of mercurial compounds in solution, showed that a gradual and slow precipitation caused the formation of the crystalline mercuric sulphide, cinnabar; while a sudden precipitation results in the formation of amorphous mercuric sulphide, meta-cinnabarite, accompanied by a small quantity of metallic mercury. Prof. S. B. Christy considers the formation of the minute globules of liquid mercury with the amorphous sulphide on precipitation by sudden dilution, as probably similar to the action of water on cuprous sulphate, forming cupric sulphate and metallic copper in the form of a fine red powder. It may be assumed that in the lower parts of the deposits gradual decrease in temperature and pressure of the solution will be the rule, and that sudden changes will be more likely to occur nearer the surface. Mercurous and mercuric oxides, sulphates and nitrates are known salts of mercury, but it appears doubtful whether the conditions required for their formation are ever present in nature. A tellurate of mercury is known (magnolite), but no sulphate has as yet been found. Lately Mr. H. W. Turner has found at Terlingua, Texas, an oxychloride of mercury, terlinguaite, Oxidation of the mercuric sulpho-salts could take

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[1] S. B. Christy. *American Journal of Science*, Vol. XVII, Third Series, 1879; J. Le Conte and W. B. Rising. *American Journal of Science*, Vol. XXIV, Third Series, 1882; J. Le Conte. *Ibid.* Vol. XXV and XXVI, 1883, and G. F. Becker. *Monograph XIII.* United States Geological Survey, 1887.

[2] J. E. Spurr, 'Geology of the Yukon Territory,' 18th Annual Report United States Geological Survey, Part 3, p. 299. J. H. L. Vogt, 'Genesis of Ore Deposits,' American Institute of Mining Engineers. Vol. XXXI, p. 131. J. F. Kemp, 'Igneous Rocks and Circulating Waters as Factors in Ore Deposition,' *Transactions* A. I. M. E. Vol. XXXI, pp. 169-198. W. H. Weed, 'Ore Deposition near Igneous Contacts,' *Transactions* A. I. M. E. Vol. XXXIII. Richard Pearce, *Transactions* A. I. M. E. Vol. XVIII, p. 453.

[3] G. F. Becker, *Monograph XIII*, United States Geological Survey, pp. 52 and 453.

[4] *Op. cit.* p. 367.

[5] 16th *Annual Report* United States Geological Survey, Part 2, p. 448.

[6] Quoted in *Monograph XIII*, United States Geological Survey, p. 18.

[7] *Ibid.* p. 286.

[8] *American Journal of Science.* Vol. XXVI, Third Series.

[9] 16th *Annual Report*, United States Geological Survey Part 2, p. 451.

[10] C. R. Van Hise. *Bulletin* Geological Society of America. Vol. IX, p. 281.

place, and might result in the formation of native mercury, but it is improbable that these reactions occur in nature.

Nearly all the quicksilver deposits show the presence of carbon, in the form of fluid, non-oxygenated hydro-carbons, of solid, oxidized hydro-carbons, bitumen, or in gaseous form as marsh-gas, and similar hydro-carbons, and as carbon dioxide. These hydro-carbons, when present in excess, prevent the oxidation of the ores; it is, therefore, all the more doubtful if the native mercury can be formed by chemical re-actions on the mercuric sulpho-salts in the solution, or after their deposition in the lower zones.

In the belt of oxidation the presence of metallic mercury might possibly be explained. As far as observed, however, quicksilver deposits are so closely allied to solfataric water circulation that, as mercuric sulphide is a stable compound, no decomposition of that sulphide takes place to any extent; and where the actual formation of mercurial ores can be observed, we find them in the form of cinnabar.[11] Besides the formations of cinnabar deposits already mentioned, the writer observed a similar one in Devils Cañon, near the Geysers, Sonoma county, California; no native mercury could be detected accompanying the cinnabar; neither was this the case in the cinnabar forming on the walls of the cuts in Sulphur Bank; nor in the cinnabar being deposited at the present time on the sides of the tunnel in the Bernal mine, El Dorado county, California.[12]

Becker[13] attributes the formation of the native mercury to rapid precipitation, and its accumulation in the lower portions of the mine to its fluidity and high specific gravity. Assuming this to be the case, it must be observed that while, as stated above, native mercury is formed by sudden precipitation—hence in combination with amorphous mercuric sulphide—it is generally found associated with cinnabar in the ore deposits. The amorphous sulphide is transformed into the crystalline sulphide by re-solution and gradual precipitation; this requires the agency of a solution containing alkaline salts with an excess of sulphur. Why should the native mercury under these conditions remain unchanged, and not be changed into a sulphide?

As to the accumulation of the native mercury in the lower portions of the mines by reason of its fluidity and high specific gravity; why should the native mercury invariably stop in its downward course near the zone of rather sudden impoverishment of the ore, and collect there? The fissures appear in all cases to continue downward, and I can conceive no reason to account for this localization of the migrating liquid mercury. Besides, when carefully studying the ore of the Socrates mine, in Sonoma county,[14] where the mercury occurs principally in the native form, we find in the fractures of the rocks the native mercury associated with some cinnabar, but in the inside, upon smashing the rock, only minute globules of native mercury, unaccompanied by cinnabar, are found. If the native mercury was originally present as a sulphide in the solution, the conditions ought certainly to be reversed. Furthermore, in the water collecting in the cooler condensers of quicksilver furnaces, minute globules of quicksilver are entrained; various methods are used to save this mercury—for instance, at New Almaden by a series of small settling tanks—but only part of the mercury is saved. Would it then not be probable that the ascending hot waters would carry at least some of these minute mercury globules with them, and deposit them in the upper zone of ore-deposition?

Christy states:[15] "Unless we regard it (the occurrence of native mercury) as the effect of the local oxidation of a very stable compound, its appearance is well-nigh inexplicable upon either hypothesis" (sublimation or deposition from solution). We may then admit that if the genesis of quicksilver ores is to be attributed to a solution of mercuric sulphide in waters containing alkaline compounds and sulphur, and a deposition from these solutions, in other words, as the result of exclusively aqueous actions, the mode of occurrence of the native mercury in these deposits is, as yet, an unsolved problem.

The writer has in his possession a piece of a brick from the foundations of a dismantled furnace at New Almaden. This brick is permeated with mercuric sulphide and native mercury. Mr. Thos. Wasley, foreman of the reduction works at New Almaden, writes: "The bricks in question were taken from a 100-ton furnace, lined with one foot of fire-brick all through the fire-places and hot air chambers, and I would state that we find no mercury whatever in the fire-bricks. The foundation of the furnace was six feet thick, and contained three arches under the furnace. All the bricks in the foundation contained more or less mercury, but the richest specimens were found one foot above the archways. A cold air current, continually traveling through the archways, causes the mercury to condense. I discovered mercury from the base of the arch to the bedrock, a distance of 47 ft." We have here cinnabar and metallic mercury, formed simultaneously by the cooling of vapors of sulphur and mercury. It does not appear to me improbable that, at a not excessive depth, conditions existed at the time the quicksilver ores were primarily formed, which would produce similar results, even if the amount of water-vapor present was much larger, as certainly must have been the case.[16] That these primary quicksilver minerals have been transported and concentrated in their present position by the agency of circulating waters is readily granted. The question, whether metallic mercury would not be changed into mercuric sulphide during this period of transportation and concentration, has already been raised above. Mr. Becker[17] in all his tests used mercuric sulphides. Prof. Christy[18] used a black amorphous mercuric sulphide, precipitated from a chloride solution by sulph-hydric acid.

It may be possible that under certain conditions the sulphide is more soluble than the metallic mercury; that part of the latter is changed into sulphide, and part left in, or close to, its place of primary formation in the metallic state, or is partially entrained by the circulating waters and subsequently deposited, but mostly near its original *locus*; that, further, the lower limits of the zone of deposition are controlled by heat conditions, in a manner similar to the distribution of the mercury above described in Mr. Wasley's interpretation of the facts as found in the bricks.

The heat at the top of a quicksilver furnace is about 375° C.;[19] it may certainly be assumed that the portion of the masonry wherein the quicksilver was found in the foundations of the New Almaden furnace was at a lower temperature, but certainly not higher. The statement of Mr. Wasley, that no mercury was found in the fire-bricks, shows that the mercurial vapors were expelled from the zone of high heat.

(*To be continued.*)

[11] J. Le Conte and W. B. Rising. *American Journal of Science.* Vol. XXIV, Third Series, p. 27; J. Le Conte *Ibid.* Vol. XXV, Third Series, p. 425; 'The Quicksilver Resources of California,' pp. 45 and 65.

[12] *Op. cit.*, p. 190.

[13] *Monograph XIII*, United States Geological Survey, p. 388.

[14] 'Quicksilver Resources of California,' p. 116.

[15] *American Journal of Science.* Vol. XVII, Third Series, p. 463.

[16] J. F. Kemp. *Transactions* American Institute of Mining Engineers. Vol. XXXI. 'The Rôle of the Igneous Rocks in the Formation of Veins'; and *Ibid.* Vol. XXXIII. 'Igneous Rocks and Circulating Waters, as Factors in Ore Deposition.'

[17] *Monograph XIII*, United States Geological Survey, pp. 419 *et seq.*

[18] *American Journal of Science.* Vol. XVII, Third Series.

[19] 'Quicksilver Resources of California,' p. 236.

MINING IN RUSSIA.

The British consul at St. Petersburg states that the production of coal in the western part of the Don basin during 1903 showed an increase of more than 1,000,000 tons over the preceding year, when the output was 8,250,000 tons. The question of introducing coal for domestic purposes is becoming more pressing as the supplies of wood diminish, and fears are expressed of the probability of a coal famine, when it shall be necessary to draw upon the supply for household use. Attempts to utilize the fine and waste coal, which is produced in large quantities at some pits, have been unsuccessful so far, owing principally to the lack of a good binding material. Until recently the customs duty on tar was £2 per ton, making it too expensive for this purpose. By a government order published on May 21, 1904, however, the importation of tar for use in coal briquetting has been declared free of duty for a period of 10 years.

As a gold producer Russia stands fourth on the list among the countries of the world, and in 1903 yielded about 7 per cent of the total output. In the Ural district the mining industry is making some progress, due to the introduction of modern methods and machinery, under the direction of British and American engineers. A large gold-bearing tract in northern Manchuria was under development when the war broke out. It is announced that an Anglo-Russian company has been formed to work gold and platinum mines in the governments of Perm and Orenburg. Of the output of platinum last year, which amounted to 366 poods, only a small quantity was retained in the country. The mine owners of Perm at a recent meeting considered the plan of organizing a syndicate to manufacture platinum articles in Russia.

West Virginia leads the States in the production of natural gas. Probably 200,000,000 cu. ft. daily pass out of the State through great 16 and 20-in. pipe lines to Pittsburg, Cleveland, Toledo and intermediate points, while within the State 150,000,000 to 200,000,000 cu. ft. daily are used for pumping and other purposes connected with the gas and oil industry, and the entire quantity consumed in the State, generally in the most wasteful manner, for glass factories, brick and pottery works, electric power plants and city water works, etc., is 400,000,000 to 500,000,000 cu. ft. daily; as much more is wasted through leaking joints, unplugged wells, etc., making the total daily output about 1,000,000,000 cu. ft. daily, equivalent in heating power to 40,000 tons of coal, and worth, on the low estimate of 10c. per 1,000 ft., $100,000 per day.

BRIQUETTING IRON ORE AT HERRÄNG.*

By HENRY LOUIS.

The Herräng iron ore mines, owned by the Herrängs Grufaktiebolag, are situated on the Baltic coast of Sweden, 60 miles north of Stockholm, and about 30 miles east from the famous Dannemora mines. The property is 11 miles by road from Häfverö Sund, the terminus of a narrow-gauge railway from Stockholm. The ore deposits consist of irregular lenticular masses of magnetite enclosed in crystalline Archean rocks, mainly granulite-gneiss. The lenses are for the most part small, the largest having a length of about 180 ft. and an extreme width of 90 ft. Some 200 separate deposits have been worked, and the existence of many more has been proved by magnetometric measurements.

The ore consists of granular magnetite and numerous accessory minerals, the most important of which are chalcopyrite, zinc-blende, galena, and rarely magnetic pyrite, besides gangue minerals. Near the surface it is practically free from sulphides, but the proportion of the latter increases rapidly in depth. The ore, as mined, contains from 35 to 40 per cent of iron and 1 to 1.5 per cent of sulphur. The phosphorus, as in all deposits of this type, is low, usually under 0.01 per cent.

The plan of operations as carried out at the mines and works was proposed by the writer, who has been ably seconded by Mr. Gustaf Gröndal, under whose direct supervision the plant was erected, and successfully started at the beginning of the present year. The plan in brief is as follows: The ore is conveyed by aerial tramway to the crushing works, where it is broken and crushed wet. The pulp thus produced runs to the magnetic concentrators, and the magnetite extracted is conveyed to the briquetting plant. After stamping and passing through the briquetting furnace, the briquettes are hoisted to the top of a pair of charcoal furnaces, where they are smelted into high-class pig iron. The waste gases from the blast furnace are used in heating the briquetting furnace and also in the gas engines which furnish the blast and drive the dynamos of a central electric station, from which power is conveyed to the central works as well as to the various mines.

Before briquetting, the concentrates are placed in a storage bin, where they remain about a week so as to become thoroughly dry. The material is lifted from the storage heap by a bucket elevator to the hoppers that feed the briquetting presses. The presses, of which there are two, are of the drop type, the plunger being lifted by a three-throw cam, so that each briquette receives three blows. The height of the drop is about 7 in. and the falling weight about 1,600 lb. The briquettes measure 6 by 6 by 3 in. and weigh about 10 lb. Each press makes from 8 to 12 briquettes per minute and requires 3 h.p. As they come from the press the briquettes are placed on cars made of iron and covered with fire-brick, holding about 15 cwt. The loaded cars are transferred one by one to a long, tunnel-shaped furnace, which is gas-fired. The combustion chamber of the furnace extends about one-third the length of the furnace from the intake end. All the cars are made with a groove along one end and a projecting rib at the other, so as to fit gas-tight. The longer sides of the cars are provided with a deep flange, which dips into a channel filled with sand, running the full length of the furnace. The row of cars thus constitutes an air-tight horizontal partition, below which the air needed for combustion is admitted, thus keeping the frames and running gear cool. The wheels move in roller bearings and are lubricated with graphite. The products of combustion pass from the cars of briquettes as they advance into the combustion chamber, heating the latter, and in turn becoming so thoroughly cooled that they pass into the stack at a temperature of only about 100° C. One car is taken out regularly every half hour.

When fired with producer gas, it was found that the consumption of coal in the producer amounted to 3.75 per cent of the weight of briquettes burnt. There are three of the furnaces, and their output is a little more than 100 tons per 24 hours. In addition to the mechanical action, the furnace is an exceptionally efficient calciner for removing the sulphur.

After firing, the briquettes are removed from the cars and stacked close to a small Blake crusher, in which they are broken to convenient size for charging into the furnace.

* Abstract of an article read before the Iron and Steel Institute, May 1904.

RESULTS OF THE TAVENER PROCESS.

K. L. Graham, in the *Journal* of the Chemical, Metallurgical and Mining Society of South Africa, May, 1904, p. 389, reported the results of nearly a year's working of the Tavener process at the Geldenhuis Deep mine. The average monthly cost of refining the precipitate in the old way (removal of zinc by sulphuric acid and melting in reverberatory pot furnace) for six months ending with June, 1903, was £16 10s. for coal, £43 2s. 2d. for pots and liners, £84 14s. 6d. for acid and £26 7s. for fluxes; total, £170 13s. 8d. By the Tavener process, coal cost £18; acid, £3 15s.; lead, £9 9s. 7d.; bone ash, £6 13s. 4d.; pearl ash, 10s.; depreciation of working bottom, £7 10s.; total, £45 17s. 11d. This showed a net saving of £124 15s. 9d. per month, or approximately £1,500 per annum. It is optional whether or not acid shall disappear entirely from the cost sheet. Slags, instead of carrying 30 oz. per ton after crushing and sluicing, now run about 15 dwt.; at some works considerably less. About 50 oz. gold per month accumulated in slags from the old pot furnace, the loss in selling which averaged about 15s. per fine ounce, or £37 10s. per month. By-products have disappeared from the works' records. Labor cost is about the same in each process. Depreciation is reckoned on the probability of having to replace the bottom of the Tavener furnace after 12 months' use, although the indications are that the actual life will reach 20 months.

In putting in the furnace bottom, a wooden mold of the proper size and shape is first placed in position. Into this a mixture of 5 parts crushed assay crucibles, 1 part cement and 1 part sand is tamped. Upon this, when dry, Stourbridge bricks are laid endwise, the sides and ends being ground down perfectly smooth and washed with a solution of fire-clay before laying, great care being taken in fitting the joints. Where the sides join the bottom, wedge-shaped bricks are put in to bring as much as possible of the weight of sides and arch to bear in keying the bottom. The loss by absorption in a bottom constructed in the above manner is exceedingly small. Mr. J. R. Williams has proposed to use a brasque bottom.

D. V. Burnett reported that he had been using the Tavener process for a year, without employing 1 lb. of acid to dissolve zinc. It appears necessary to add iron, up to 10 per cent of the charge, in order to insure clean slags. Old tins are preferable to battery screens and iron shavings, as they do not oxidize so quickly, or collect into a ball, like shavings. A sound cupel test is made of 430 lb. bone ash (one-half of 30-mesh, one-half of 80-mesh), 42 lb. water, 14 lb. caustic potash, carefully tamped. Litharge runs best if kept at a medium temperature on the bath. The bullion should not be over 7.5 per cent; otherwise bits break from the feed and drop into the bath, causing a ripple over the gate. Up to 3,000 oz. of bullion may be fed hourly. The litharge usually assays 3 to 5 oz. per ton.

PROGRESS ON A NEW COAL RAILROAD.

The Western Maryland Railroad has a line from Baltimore to Cherry Run, Md., and owns about 98 per cent of the stock of the West Virginia Central & Pittsburg Railway, which controls a system of tracks from Cumberland, Md., to Bellington, W. Va.; and also owns about 100,000 acres of bituminous coal land in West Virginia. The railroad is controlled by stockholders of the Wabash, and is of importance from its being destined to form part of a new through system to tidewater that may, among other things, have an important influence in the Atlantic seaboard bituminous trade. Work on the connecting link between the Western Maryland and the West Virginia Central & Pittsburg, from Cherry Run to Cumberland, is progressing with about 2,500 men employed. A recent statement by W. S. Pierce, chairman of the board of directors of the Western Maryland, says that rights of way, excepting over lands owned by the Chesapeake & Ohio Canal Company, have been substantially acquired. The Maryland legislature, having granted authority for condemning rights of way over the canal lands and crossings of the canal, surveys and other details in proceedings for acquiring the property will shortly be completed. The company's engineers estimate that 12 months of uninterrupted work will complete the line; the original line has been largely relocated to secure minimum grades and curves. The Port Covington terminals of the company in Baltimore will include, besides a merchandise pier, a coal pier with unloading facilities of 14,000 tons in 12 hours and ample car-float facilities.

Among the States of Australia, Victoria holds the record for the largest production of gold in a single year. The output in 1856, five years after the first discovery of gold, amounted to 3,053,744 oz., valued at $60,000,000 approximately.

When a natural gas or oil well is drilled and so closed that the products cannot escape the gas develops a pressure known as the "rock pressure," which increases with the depth of the hole in about the same proportion as would the pressure of a column of water of the same length. The cause of this pressure is not definitely established, some geologists believing it of artesian origin, due to water from above penetrating to the oil or gas horizon, while others maintain the expansion hypothesis, first advocated years ago by J. P. Lesley, and attribute the pressure to the gas being stored in porous strata under an impervious heavy cover. Both factors probably determine the rock pressures found in most oil fields; if the original pressure was due to the formation of gas under cover, this might be maintained during long ages by the pressure of downward percolating water.

EXPLORATION IN THE SUDAN AND ABYSSINIA.

By A. H. ACKERMANN.

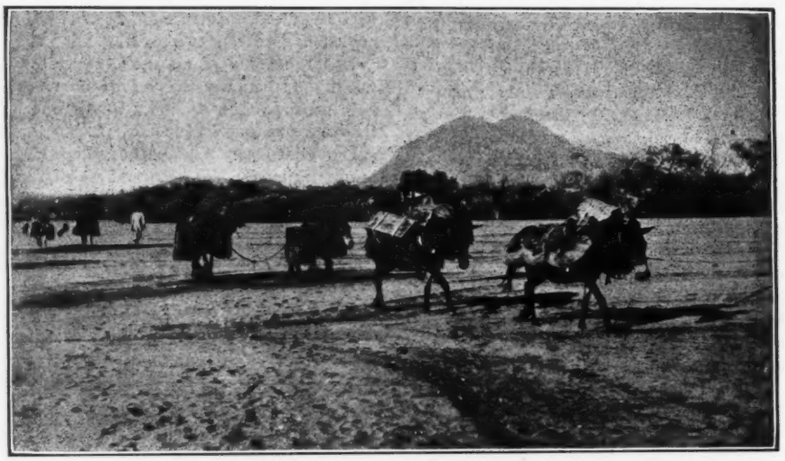
Having read the articles contributed by Mr. A. R. Townsend and Mr. F. C. Roberts, on travel in Mexico and British South Africa, respectively, it has occurred to me that a few short notes on a recent prospecting trip in the Lower Sudan and northwestern Abyssinia might possibly be of service to some of your readers who, at some future date, may be traveling through this little known country.

The country to which I refer is situated between the 12th and 9th degrees of north latitude, bounded on the east by the rivers Blue Nile and Dabus, and on the west by the White Nile, comprising in all about 31,000 sq. miles. It is accessible by steamer, either by the White or Blue Nile. On the White Nile the Government runs a fortnightly service from Khartoum to Fashoda, all the year round, the journey taking about three days. The Blue Nile is only navigable as far as Roseires, to which point a fortnightly service is run from Khartoum during the period from July to December; after this time the river is only navigable to the native sailing boats (*guyassa*), the journey by steamer taking about ten days. It is well to state here that these Government boats do not provide any accommodation. Food, service, etc., have to be provided by the passenger.

The topography of the country, broadly speaking, consists of a series of connected mountain ranges, striking in a N.W. and S.W. direction, flanked on both sides for about 5 to 10 miles by a series of rolling hills. These mountain ranges form the watershed of the region. On the east the rivers drain into the Dabus and Blue Nile, and on the west into the White Nile. To the east and west of these hills is a flat plain, with occasional hills, which stand out quite conspicuously. The plain is covered over with black cotton-soil or sand. This forms a layer of varying depth, rendering prospecting exceptionally difficult, except among the hills. The rivers on the eastern side were generally found to have running water all the year round, but those on the west, with very few exceptions, disappear during the dry season, water being often found, however, by sinking in the dried-up river-bed to the bedrock.

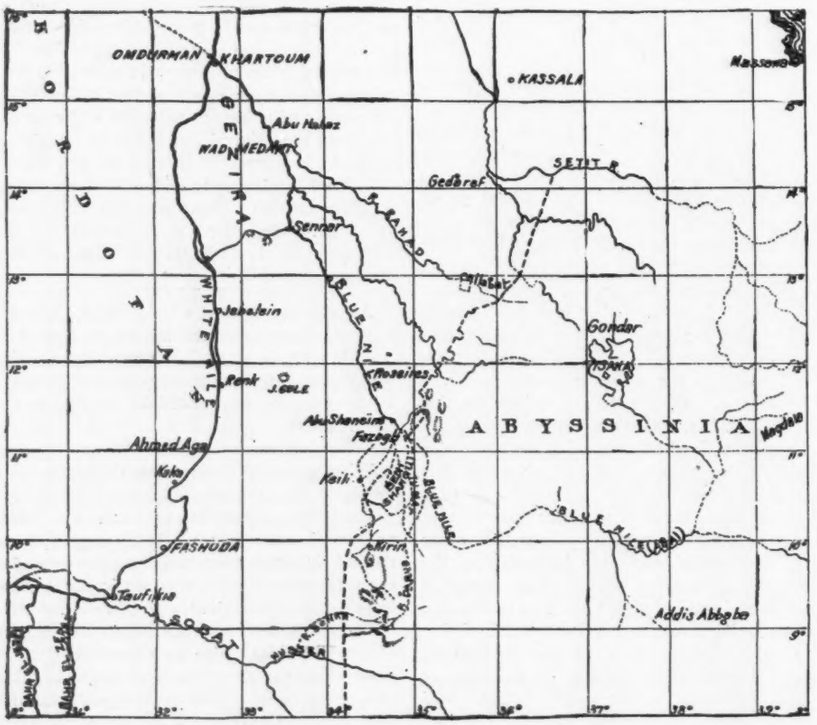
The country is covered with timber of small growth and in the south bamboo scrub predominates, rendering traveling with transport both difficult and slow. The timber is suitable only as fuel, and is of no value for general mining purposes. The hills in the vicinity of the mountain ranges are covered over with long grass, which grows anywhere from 5 to 10 ft. high. This has to be destroyed, generally by burning it down late in the dry season, before starting prospecting operations.

Very little is known of the geology of the country. No old workings of any appreciable value or importance have as yet been discovered. The natives have confined their endeavors to working the drift near the base of some of the hills, and washing in the streams during the rainy season. From the small amount of systematic prospecting that has been carried out, it appears that the gold is closely associated with galena and pyrite. The free gold encountered was always confined to the honey-combed quartz. The outcrops are not well defined, and from surface indications and data gained from shallow workings it appears that the ore-bodies are lenticular.



MULE TRANSPORT NEAR TUMAT RIVER.

Transport difficulties in the country are innumerable. Owing to the absence of any roads whatever wagons are out of the question, although in places roads could be cut at a small expense, and wagons used in the dry season to great advantage. Pack-trains of mules, camels and donkeys have to be relied upon. Camels in the western section of the country are absolutely necessary for transport, owing to the scarcity of water. They, however, do not thrive in the climate and are always a source of trouble. They can be purchased at most of the various towns on the Blue Nile (Wad Medani or Singa probably offering the best markets) at prices averaging anywhere from $40 to $75 apiece. Mules can be used in the eastern section of the country to advantage, and are found to be satisfactory. They stand the climate well, and any amount of hard work. They can be purchased in Abyssinia at prices averaging $25 to $30 each, the supply in the Sudan being limited. Donkeys also stand the climate well. They are, however, not so satisfactory as mules, for, when loaded, they require just as much attention and travel very slowly. They can be purchased anywhere along the Blue Nile at about $15 each. Pack and riding-saddles have to be imported, as the native saddles are most unsatisfactory. A fair load for a camel is 350 lb.; a mule, 150 to 200 lb.; and a donkey, 100 lb. In traveling it is found necessary for one man to take care of a loaded camel; one man is needed for two loaded mules and one man for two loaded donkeys. These men are held responsible for their different animals. Horses do not thrive, and cannot stand the hard work. During the rainy season, which extends from June to September, traveling is practically impossible, because the black cotton-soil gets into such a boggy condition that the animals are unable to proceed through it. The average rate



SKETCH MAP OF THE SUDAN.

of travel with loaded transport is about three miles per hour; the daily distance traveled is somewhat erratic and depends entirely upon the water-supply. Native information upon such matters is always incorrect, for they do not appear to have the slightest idea of either distance or time. The daily marches averaged from 6 to 10 hours per day, a rest of from two to three hours being taken during the hottest part of the day.

A CAMP IN THE SUDAN.

In the equipment of an expedition for prospecting it is necessary to figure upon taking every necessity of life, with the exception of the meat supply, which can be purchased or shot to the extent of at least one-third. The country is practically destitute of vegetables, except along the banks of the Nile, where occasionally a few can be purchased. Oxen, sheep and goats can be bought at most of the larger villages, together with a fair supply of chickens.

In packing the provisions, which are, of course, all canned, it is advisable to divide them up in boxes 2.5 ft. long, 1 ft. broad and 1 ft. deep, estimating that two boxes contain a supply of everything sufficient to last a certain number of men a certain time. It is preferable to have these boxes supplied with rope handles at each end, and the lids should be screwed down and padlocks attached. Ordinary camp equipment should be of the very lightest and most compact designs. Tents are unnecessary. In the transportation of water, it is advisable to take specially prepared canvas bags. These are made out of navy canvas and can be constructed to hold from 5 to 6 gal. on each side of a mule.

The climate during the dry season may be called healthy, provided ordinary precautions are taken. As in any other tropical country, however, a large quantity of medicines is necessary, for the natives always require considerable doctoring.

The labor question at present is quite a serious one. It is impossible to obtain any local supply, the natives being too lazy and contented with their lot to think of doing any hard work. They grow their *dhurra* (native wheat) in only sufficient quantities for their own consumption and payment of taxes. It is therefore necessary to bring Sudanese from Khartoum, where there is a limited supply. These Sudanese are vastly superior people to the natives, and develop into good workmen in a short time, although most of them have never seen nor handled tools before. In the vicinity of Khartoum the government pays laborers about 10 cents per day, while carpenters, builders, and blacksmiths get 50 cents per day.

In engaging labor at Khartoum, food should be included in the arrangements, with a fixed wage per month—about $5 to the natives and $15 to servants and cooks. The latter are usually able to speak some English, and act as interpreters; it is necessary to supply them with donkeys and native riding saddles. Arrangements have to be made with the agents at Khartoum to pay the wives of the natives so much per month, the amount depending on the generosity of the husband. Ten per cent of the wages is paid to the men when in the field, the balance remaining until their return to Khartoum. In this way the great trouble and risk of taking large sums of money into the country is obviated.

Dhurra is the staple diet of the natives. It has to be brought into the country from the banks of the Nile, where it is grown in large quantities. The supply in the interior is only sufficient for local requirements. It is advantageous, if possible, to purchase tax-dhurra from the Government, costing about $2 per *ardeb* (300 lb.) Three pounds per day is considered the average allowance for a native, with a small amount of meat, when possible—say, every four or five days.

Probably the highest pressure ever shown by any natural gas well was at a well on the Michael Funk farm in the Nineveh region of Greene county, Pa. The well struck the Campbell's Run oil sand and, though the volume of gas was comparatively small, the rock pressure finally exceeded the limit of the gauge (1,500 lb. per sq. in.), and blew off the 2-in. pipe by which the well was shut in. As this pipe was supposed to be tested to 2,000 lb. per sq. in., the ultimate pressure shown by the gas was probably not less than 1,600 lb. per sq. in. The highest pressure now recorded in West Virginia is at a well on the J. S. Norris farm in Lewis county, 1,125 lb. to the inch.

The deepest oil or gas well in the United States was completed in 1898 on the William Bedell farm at West Elizabeth, 12 miles southeast of Butler, Pa. It is 5,575 ft. deep. A 10-in. casing was used to 40 ft., an 8.25 in. to 360 ft., a 6.25-in. to 1,320, and from thence to the bottom is a 6.25-in. hole. Record was kept of the geological formations, the hole, starting in the Carboniferous 150 ft. below the horizon of the Pittsburg coal, and ending in a black shale, supposed to be the Marcellus shale of the Middle Devonian. Prof. Hallock, of Columbia University, made some careful tests of the temperature. At 525 ft. the temperature was 57° F.; at 2,252 ft. 64°; at 2,397 ft. 78°; at 5,010 ft. 120° and at 5,380 ft. 127°, an increase with depth of about 1.4° per 100 ft. An accident left the tools and 1,000 ft. of cable in the well, plugging it, or it would have been drilled deeper.

SINKING FOR WATER.

ON THE CRIB SETTING OF A DEEP LEVEL SHAFT.*

BY HARRY D. GRIFFITHS.

On the Rand it is usual to rest the collar set of a deep level shaft upon a wall of concrete 3 ft. thick all around the shaft, and resting upon rock formation. The height of such a wall is regulated by the depth at which solid rock is encountered, and it seldom exceeds 10 ft.; this is done to give a good bearing for the collar set, to avoid disturbance of the shaft when foundations for permanent heavy head-gears are made, and to prevent any water percolating through the surface drift so as to rot the timbers. The arrangement answers well and is almost universally adopted.

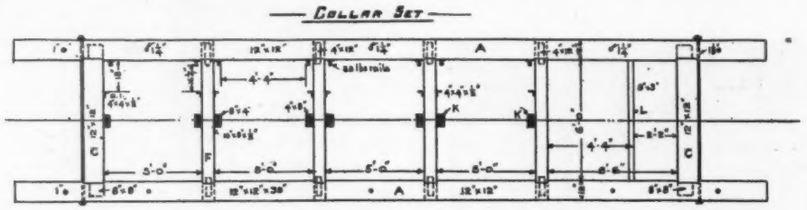


FIG: 1

On a property under my technical management, two bore-holes ascertained the depths at which the reef existed, and two shafts were designed to exploit the property on an ultimate basis of 200 stamps crushing 350,000 tons per annum. The position of one of the shafts happened to be in a slight depression of the ground, and within 300 ft. of one of the bore-holes. The section given by the latter was as follows:

Surface soil	6 ft.	Secondary formation.
Kaolin	10 ft.	
Sandstone	42 ft.	
Quartzite		Witwatersrand formation.

The weight of a concrete wall reaching down 16 ft. from the surface would have been about 2,160 lb. per sq. ft. This was thought to be too much for the kind of sandstone obtained, and it was decided to have recourse to crib-setting. The excavation was therefore begun, and was made 3 ft. 6 in. greater all round than the outside dimensions of the timber sets. The shaft has four haulage compartments, each 5 ft. 6 in. in the clear, and one ladder and pump compartment 6 ft. 6 in. by 6 ft. in the clear, the dividers being 7 in. wide. The inside dimensions were therefore 28 ft. 10 in. by 6 ft. The timbering, as designed, is that generally adopted on these fields, and is shown in the accompanying drawings.

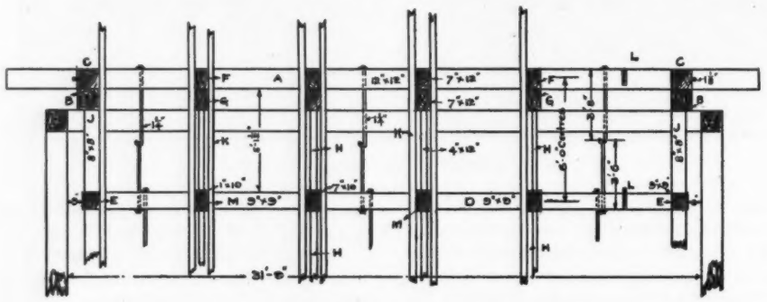


FIG: 2.

Note: First six Sets 4'-0" Centres, after that 6'-0" Centres.

The excavation, which was 37 ft. long and 14 ft. 6 in. wide, was carried down to a depth of 23 ft., where a tough but soft sandstone was reached. The formation cut through consisted of 6 ft. of black mud, followed by kaolin, fireclay and variegated clay, and it required careful staying and shoring all round; this soft overlying material was not disturbed, and with the exception of a small amount of surface scaling on drying, no trouble was encountered.

In the sandstone, at 23 ft. down, a ledge 3 ft. wide was chiseled and leveled, upon which 1 in. of cement mortar, consisting of 3 parts sand to 1 of portland cement, was laid and allowed to set. The excavation was then resumed, but of dimensions 3 ft. less all around, and the timber for the crib set was prepared. This was made of top and bottom sets of 12-in. pitch pine, with 12 uprights of same dimensions, and as shown in Fig. 6, 7 and 8, the joint adopted for the sets being the same as for the sets of shaft timber as shown in Fig. 5. Each upright was mortised into the sets, the mortises being 12 in. long, 4 in. wide and 4 in. deep, and was bolted to the sets by means of two plate bolts ⅞ in. with four ¾-in. coach screws. Two rows of distance pieces, 8 by 8 in., were mortised between the uprights flush with the outside of the frame, and the whole was tightened up with ¾-in. bolts.

The set being now framed and tightened, it was carefully leveled, squared and plumbed and held in position by wedging and shoring. Lagging of 12 by 4 in. pitch pine in one length, and previously steeped in hot tar, was then placed in position, wedged in, and, where possible, nailed to the set. Corrugated iron in sheets 10 ft. long and 2 ft. wide was then fixed at the back of the lagging.

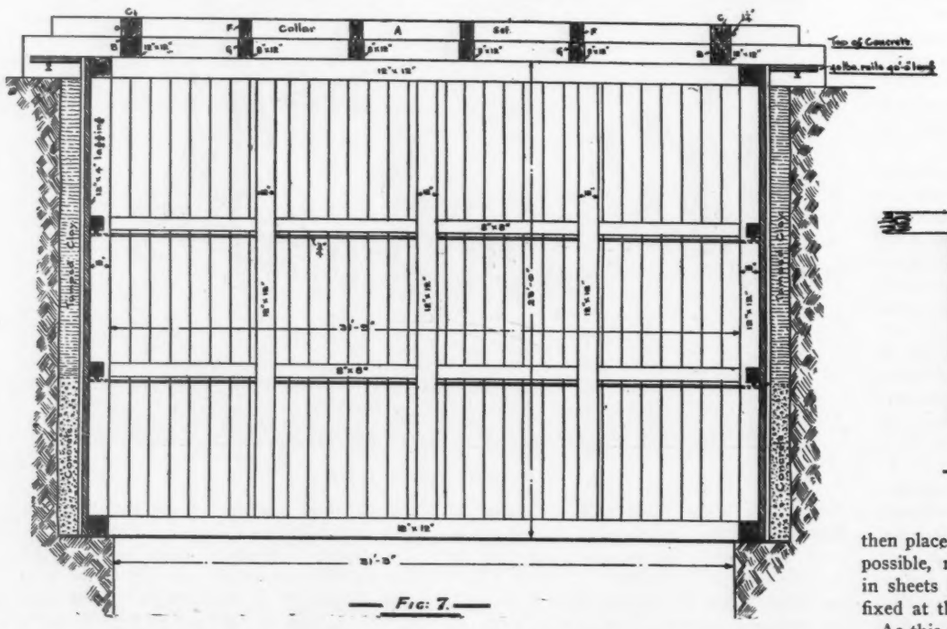
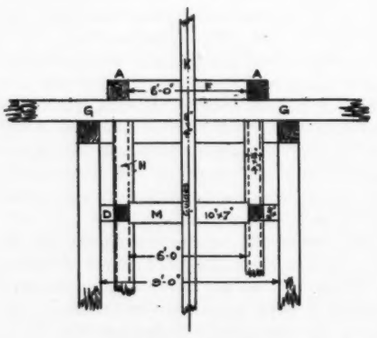


FIG: 7.



END ELEVATION.

FIG: 8.

As this work proceeded, concrete was simultaneously rammed in on opposite sides, at the back of the lagging. This concrete was composed of 4 parts broken sandstone, 3 parts sharp sand and 1 part portland cement, and

*Abstract from a paper read before the Institution of Mining and Metallurgy, London, June 16, 1904.

was well tamped to a height 5 ft. above the bottom crib set. Above this concrete, the clay, which had been taken out of the excavation and spread out at the surface in order to dry and crumble, was puddled and carefully tamped all round until it reached within 12 in. of the bottom of the collar set bearers. The cross-bearers were bolted on top of the crib sets by means of 1-in. bolts and were carefully wedged up all round. The ground around the mouth of the shaft was then leveled with the top of the rammed clay, and a sheet of concrete 6 ft. wide all round the shaft was rammed in. This concrete was made of stone 4, sand 3, portland cement 1. After 8 in. of this had been rammed into place, two rows of 45-lb. section rails were wedged up against the bearers, and the concreting was continued to the top of the cross bearers. The concrete sheet rested practically upon the original undisturbed surface of the ground, and was only completed after the tamped clay at the back of the lagging had properly settled. Since being laid on, the concrete has shown no signs of settling.

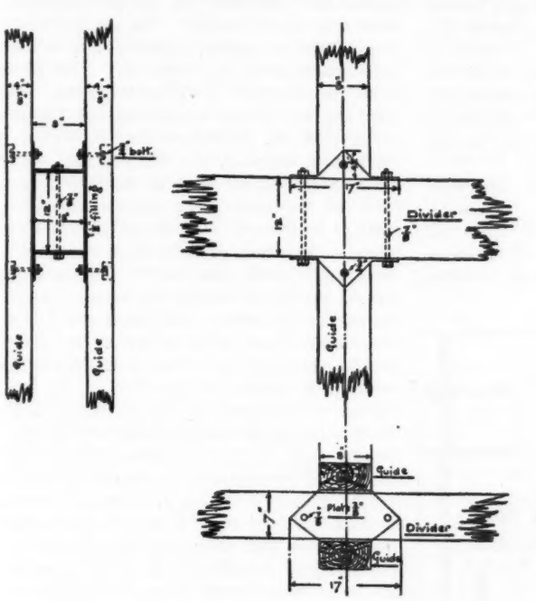
The collar set was next slipped into its place on the cross-bearers, followed by the other sets carefully wedged against the uprights of the crib set. No lagging at the back of the timbering was used until the ledge of the crib was reached. A bearer set was established in the hard sandstone at a depth of 34 ft. from top of collar set. The bearers consisted of four bearers 7 by 12 in. and two end-bearers 12 by 12 in. let in 16 in. into each wall and fixed up in concrete. The space between the lagging and the walls was filled with puddled clay, tamped with long sticks, to the bottom of the bearer set.

It should be mentioned that down to this point the sandstones and shales encountered were of secondary or coal formation lying horizontally, and that beyond this the quartzites were of the Witwatersrand formation, hard and tough, and dipping at an angle of 32°. The tamping of the clay down to the quartzites effectively stopped the dripping which was encountered during the sinking, and this portion of the work does not show a sign of moisture after several months of the wet season.

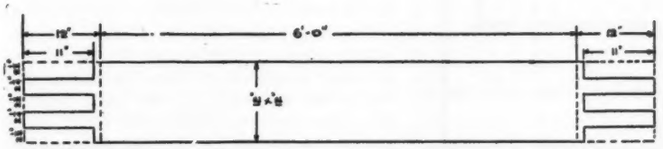
In the construction of the crib set, 494 cu. ft. of Norwegian pine were used, and the wastage for mortises was 35 cu. ft. The total weight, including bolts, iron-work, etc., was 18,000 lb. The pressure exerted on the ledge on which the crib rests, works out at a little over 220 lb. per sq. ft.; this does not take into account any additional weight which may be due to the resilience of the cross-bearers carrying the shaft timbering, and which, owing to the nature of the work, cannot be any great quantity. The total weight of timbering, including rails, guides, bolts, etc., hanging from the top cross-bearers is estimated at 15.5 short tons.

If a concrete wall of the same height as the crib set had been built, the cost would have been $3,500, the cost of cement per barrel being $9.48, the cost of making and laying concrete $14.28 per cu. yd.

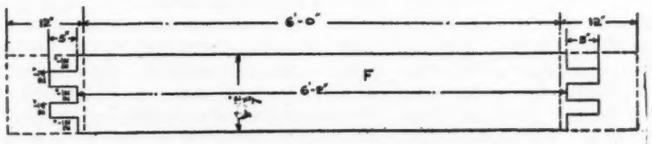
The adoption of a crib set quite independent of the shaft timbering was, under the circumstances, the simplest, cheapest and most reliable method which commended itself to those concerned. The set has not shown any sign of twisting or distortion, and the mass of water which accumulates during the wet season is effectually kept back from the shaft.



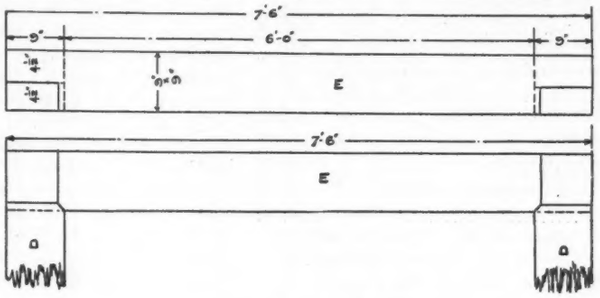
METHOD OF FIXING GUIDES
Scale 1"=1 Foot



END PLATE



DIVIDER COLLAR SET.
FIG: 4.



END PLATE OF SET.
FIG: 5.

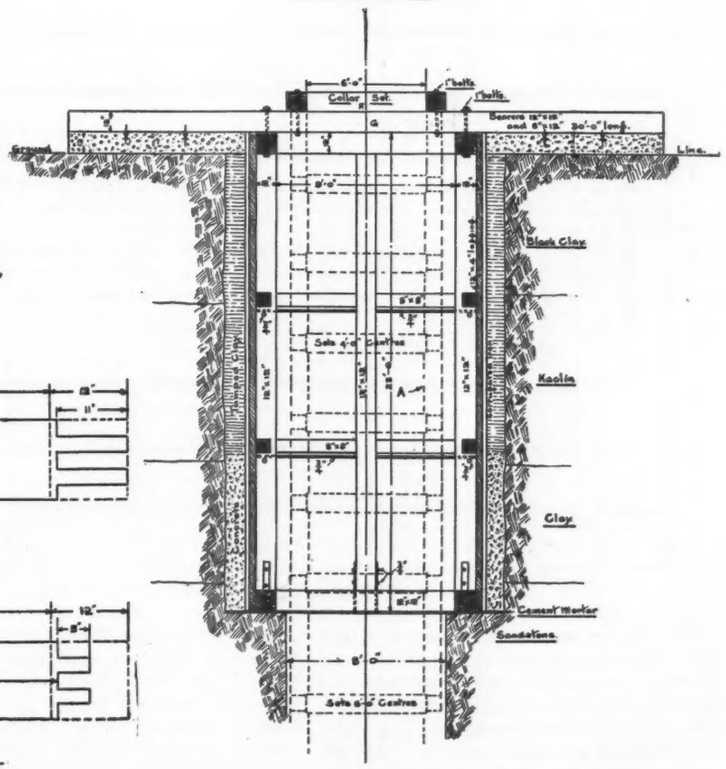


FIG: 6.

Should any twisting occur in the crib set this need not necessarily affect the shaft timbering proper, as any such occurrence would be met with a re-wedging of the timbering. This, however, is not anticipated.

The cost of crib setting complete and in place was as follows:

494 cu. ft. pitch pine	$592.66
5335 cu. ft. 12x4 in. lagging	292.32
Total lumber	$884.98
Railage and cartage to mine	372.82
Bar and sheet iron	10.80
Bolts, nuts and rails	15.32
Coal tar	17.28
Paint	6.72
Galvanized iron (second-hand)	30.00
Cement	50.40
Stone and sand	21.60
White wages	309.60
Native wages; 158 shifts	81.14
Workshop expenses	19.98
Native food and compound charges	33.38
Total	$1,854.02

White wages include: Foreman, $96; carpenters, 39.5 shifts, $189.60; blacksmiths, 2 shifts, $9.60; masons, 3 shifts, $14.40.

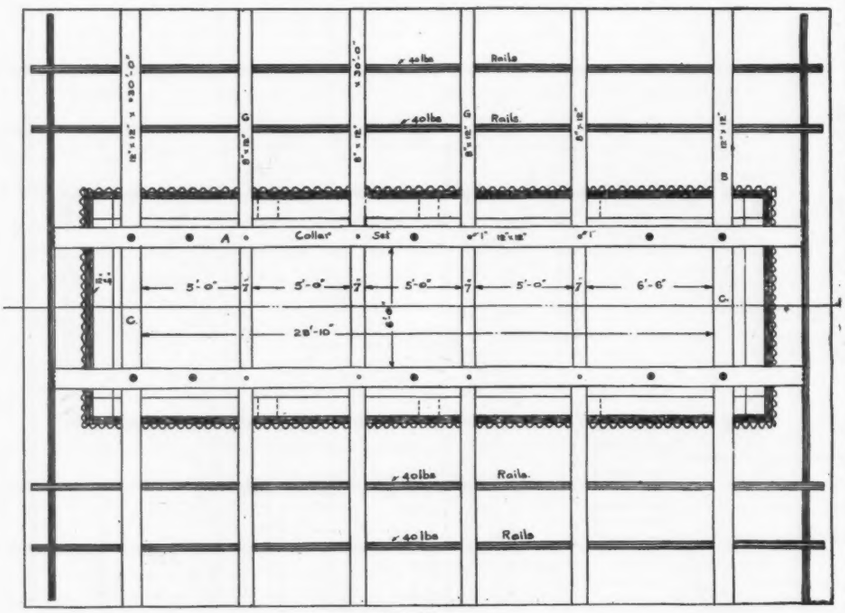


FIG. 8.

The crib set was fixed in position, lagged and rammed in, in four-day shifts. It is believed that this work is the only one of its kind ever adopted on the Witwatersrand gold-field.

The biggest gas well, in volume of gas and rock pressure, ever discovered in West Virginia was the E. C. Morgan well No. 1, drilled by the South Penn. Oil Company, 6 miles from Mannington, in Marion county. On August 19, 1893, an oil sand was struck at 3,052 ft. and at 3 ft. in this sand gas was found under such pressure that the drilling tools, weighing several thousand pounds, were lifted from the bottom and blown through the 6⅝-in. casing and more than 100 ft. in the air above the top of the derrick. Only after three months of steady work was the well controlled, by the insertion of 3-in. tubing, when it gave a pressure of 800 lb. per sq. in., the limit of the gauge, almost instantly. The well, after it had been supplying the towns of Grafton and Fairmont for several years, showed on January 1, 1899, a pressure of 550 lb. per sq. in. The volume of the gas given off at first through the open casing was probably between 35,000,000 and 40,000,000 cu. ft. daily.

NOTES ON THUNDER MOUNTAIN, IDAHO.

BY OUR SPECIAL CORRESPONDENT.

Leaving the Oregon Short Line at Weiser, the writer went over the Pacific & Idaho Northern Railroad to Council. From the latter point stage lines run northwesterly to the Seven Devils mining district, and northeasterly to Meadows, Resort and Warren. Meadows is near the head of the Little Salmon river and a stage line operates between that place and Grangeville, by way of Pollock and Whitebird. Resort is a day's ride from Meadows on the way to Warren, and consists of a hotel, stable and thermal baths. Warren is 60 miles northeast of Meadows and is situated on Warren river.

The first mine on the route is the Butler, four miles from Meadows; the owners are D. C. Blake, A. H. Butler, S. H. Coon and others, the first named being the manager. There are 700 acres in the holdings, covering a mass of sedimentary and volcanic material, lying between granite and schist walls. This lode is about 70 ft. wide, carrying free gold in volcanic ash and in silicious seams. It is said to run $4.80 per ton. The mine is operated by hydraulic methods, the lode material being such that it is readily broken by the force of water from a giant. The values are recovered in the sluice-boxes as in ordinary placer work. This season 15,000 yd. have been handled in this way, recovering 32c. per cu. yd. The plan now is to erect a mill and equip it for amalgamation and concentration, the latter to recover the gold carried in an oxidized and pyritic iron ore.

The claims of the Golden Rule Placer Mining Company are on Grouse and Seceoh creeks, in the vicinity of Resort. There are 2,000 acres in the group, the gravel being about 20 ft. deep in the beds and bars, and 15 ft. deep on the benches. The four hydraulic giants at work are supplied with water under strong pressure from 15 miles of ditches. The property was formerly owned and operated by Bohndel & Brauhan, of Resort, who sold it to the present company, of which S. S. Currey, of Milwaukee, is manager, with L. C. Hudson as superintendent. C. L. Hathaway, of Portland, is also an interested party.

In the vicinity of Warren are the Silver King, Little Giant, Iola, Mayflower, Ranier, Keystone and Arles, all of which are quartz properties. The Little Giant is in charge of Reybold & Scheeler, who have a small force of men at work. It has been operated for many years, and has been the heaviest producing lode mine in the district. The ore consists of a gold-bearing quartz, partially free milling, but accompanied by sulphides. The Silver King is situated on Slaughter creek, near Warren, the group comprising 13 patented claims. W. K. Payne and Fred S. Myers, of Richmond, Virginia, are the principal stockholders, Mr. Myers being at the mine a good part of the time. The active manager is George R. Denise, of Denver, Colorado. The mine is developed by about 6,000 ft. of crosscuts, adits, drifts and shafts. The principal vein is opened by a 1,100-ft. crosscut. A 10-stamp mill is operated by water-power. An electric generator produces current to operate Durkee electric drills in the mine. In the mill work it is claimed 60 per cent of the gold values are recovered on the plates, the latter being followed by concentrating tables, which handle a silicious iron sulphide running well in silver. The Keystone is controlled by J. B. Hecht, of New York; J. J. Torpey, of Philadelphia, and Fred S. Myers, of Richmond. The group is four miles from Warren and has three veins. An adit has been driven 600 ft. in one of these; and crosscuts are driven from the adit to the other veins. The ore is principally a free-milling quartz. The owners have erected a Merralls mill for crushing and amalgamating. The Ranier is in the vicinity of the Keystone, and is being developed under the management of J. B. Brown. On this group there are two parallel veins passing through a granite country; development on one of these shows a streak of gold-bearing quartz from one to two feet wide, the vein being about six feet wide between walls. St. Louis parties are interested with Mr. Brown, whose purpose is to install a steam hoisting plant and develop the property. The Arles group of three claims, three miles southwest of Warren, has been developed by 1,000 ft. of work, disclosing a vein of rich ore from 6 in. to 20 in. wide. It is a base ore, carrying gold and silver, and requires concentrating and smelting. The property belongs to Kelley & Patterson, of Warren. H. W. Alexander and associates are preparing to construct a dredge at Warren to work over the auriferous material on Warren creek. The Mayflower belongs to the Thunder Mountain Gold Reef Gold Mining Company, of Kansas City. The work at Warren is in charge of J. E. Jewell. Mr. C. D. Hovey, of that company, was recently on the ground, and states that an Elspass mill is to be installed this fall.

The trail from Warren to Thunder Mountain district is across a mountain range to the south fork of the Salmon, thence up Elk creek, over Elk summit to Smith creek. From the head of Smith creek I went down stream via the Crown, Independence and Werdenhoff mines to the junction of Smith with Big creek, thence up Big creek and over a snowslide trail to the west fork of Monumental creek; down the latter to its junction with the main branch of this stream, thence up the latter to Roosevelt. The distance from Warren to Roosevelt by this trail is 70 miles. The wagon road to be built between these two points will coincide with this route, except that possibly the

road will follow Big creek to its junction with Monumental creek, and go thence up the latter to Roosevelt.

On Elk summit is the camp of Mr. Newland, who is making a stopping place for travelers, and at the same time developing a group of claims in the vicinity. The Crown group on Smith creek is managed by D. McKenzie and A. J. Tourtellotte, of Boise. It comprises a large number of claims, developed by a 600-ft. crosscut, cutting one ledge of ore; a second and larger vein will be intersected by driving further. These ledges outcrop at the surface, the ore of the outcrop and in the crosscut being a quartz, partially free milling, but containing some sulphides. Good camp-buildings have been erected. On the same mineral zone, but further down stream, is the Independence group of 11 claims, which is under the management of J. B. Eldredge, of Boise. Considerable development has been accomplished, includipg a 304-ft. crosscut, 250 ft. of which is through a mineralized ledge of gold-bearing quartz, partially free, but with some iron sulphides. The body of ore passed through is said to carry uniform gold values. Still further down Smith creek is the Werdenhoff group of 18 claims, extending from the creek bed to a high point on the mountain slope. There are said to be four veins within the group, but the principal one strikes north and south through granite and porphyry, the vein matter being a gold and silver-bearing quartz. It is considered an ore adapted to the cyanide process, and a plant for such treatment is being erected, and the necessary equipment will be put in this Fall. The main lead is from 10 to 30 ft. wide, the adit by which it is opened keeping next to the footwall. H. A. Hillman, formerly at the Black Warrior mine, at Globe, Arizona, is superintendent. Ex-Gov. Frank Hunt, of Boise, is president of the company.

Between Beaver creek and Ramey creek, which drain into Big creek, is Ramey ridge, where there are a large number of locations on gold-bearing ledges in granite and porphyry. The gold is free in the quartz, and the veins are considered well-defined. On Big creek, well up toward the head of it, is Cornell, a camp and townsite started by Dr. W. Q. Cornell, who has a number of mineral locations of promise in the adjacent hills. This is where Logan and Government creeks enter Big creek, and in a number of prospects on these creeks excellent bodies of ore have been opened. The country here is chiefly granitic and porphyritic, and the ores disclosed are in good-sized fissure veins and carry gold, silver and lead in sulphides.

Roosevelt is on Monumental creek, the erosion of which has formed a deep cañon, exposing the formation on either side. This creek takes a southerly course. On the east side of the cañon there is a cluster of lofty hills called Thunder mountain. This cluster forms a divide between Monumental and Marble creeks, the latter draining into the middle fork of the Salmon. On the west side of Monumental is Rainbow peak, perhaps the loftiest point in this region. The entire region consists of porphyry, diorite and rhyolite, with phonolite and volcanic mud in places. What is locally known as the Dewey mine belongs to the Thunder Mountain Gold & Silver Mining & Milling Company, of which T. D. Barnsdall, of Pittsburg, and E. H. Dewey, of Nampa, are the principal stockholders. The 12 claims of the group lie on the west slope of Thunder mountain, being about 1.5 miles from Roosevelt. The 10-stamp mill is on the west end of the group, the ground extending easterly up the mountain slope and practically adjoining the Sunnyside group. The ore lies along a contact of dark and white porphyritic material, the former carrying the principal values. Much of the ore resembles a conglomerate, with small pebbles within a dark mass. The gangue is cut in all directions by seams and cleavages and the free gold is most conspicuous in these crevices. There is some gold, however, disseminated through all the vein matter, the entire mass being milled. A recovery of from 83 to 85 per cent of the total value is made on the amalgamating plates. The ore mills from $8 to $12 per ton, and Superintendent E. Haug states that the cost of mining and milling, including development, has, thus far, not exceeded $4 per ton. The tailings run $1.50 to $2 per ton. Equipment for a 100-stamp mill has been purchased and is on the road. The new mill will be erected at the mouth of Mule creek, which empties into Monumental. A pipe-line will convey water for mill work from Monumental to the new plant. Steam power will be used at first, but eventually electric power will be utilized. The building of the new mill will necessitate the erection of an aerial tramway about 7,000 ft. in length. The ore-body in this mine strikes northwest-southeast, and is partially in blanket form. It is opened by an upper and lower adit, the two being 108 ft. apart vertically. The lower level runs 600 ft. to the ore, thence 350 ft. on the contact, with numerous crosscuts through the ore. On the upper level there is 1,000 ft. of work on the ore-body, besides the crosscuts. Some of the latter extend 40 ft. through ore. Between the levels there is a considerable amount of stoping, the chambers being 8 sets high and 9 sets wide in places. There is a peculiar occurrence of bodies of charcoal, in form resembling logs, in various stopes. The charcoal is a perfect product, and usually has gold particles disseminated through it. There are about 4,000 ft. of development in the mine.

The Sunnyside mine, belonging to the Belle of Thunder Mountain Mining Company, occupies the eastern slope and summit of Thunder mountain. F. R. F. Lovejoy, of Pittsburg, is president of the company and the heaviest stockholder; J. C. Russell is secretary and treasurer; R. W. Purdum, of Nampa, is general manager, with E. L. Abbott as superintendent, R. L. Euler being metallurgist. In the main group are nine contiguous claims. The openings disclose a blanket ledge, striking northwest, with a westerly dip of 15°. Winzes and raises through it show a thickness of about 30 ft. A capping of volcanic mud overlays the blanket, with diorite below it. The vein material is a quartz-porphyry, containing some iron sulphides, but as a body it is a free-milling gold ore. Tests are said to have demonstrated that over 80 per cent of the gold will amalgamate; and that extraction by cyanide has reached 92 per cent. In sampling the ore it is learned that 111 assays of that many samples for a distance of 105 ft. on the ore averaged $14.75 per ton; samples taken every foot for 42 ft. in another place are said to have averaged $12 per ton. It is also stated that the gold is disseminated through the gangue as well as in the cleavages. The ore has been opened 208 ft. on the strike and 160 ft. laterally. A crosscut from the surface was driven 228 ft. to the ore, cutting it on its dip, and was extended thence 570 ft. as an adit. A lower crosscut, now in 1,400 ft., will strike the blanket ledge on its dip 300 ft. lower than the upper level. The total development aggregates 4,000 ft. An Otto aerial tramway, 7,480 ft. long, from the mine to the mill-site on Marble creek, is nearly complete. Construction work on the 40-stamp mill is in progress. A steam-power plant will be installed, but electric power may later be generated on Marble creek. A flume conveys water from Marble creek to the mill site, which is 1,600 ft. lower than the mine. The company has built nearly five miles of wagon road and another road is being built up Mule creek from Roosevelt to connect with the mine roads. A force of 220 men is being employed, and it is thought 100 men will be at work next winter.

The H. Y. and the Climax mining companies are operating under the management of C. J. Perkins, with W. H. O'Brien as superintendent, their properties being on the south slope of Thunder mountain. A 360-ft. crosscut has been driven and other work of development, demonstrating the existence here of a blanket deposit within a porphyritic country, with a rhyolite capping. A seam of phonolite has been encountered which is slightly mineralized. The main development is to be by means of a shaft with a crosscut to the ore. For this work a steam hoist is being taken into the camp. A rotary mill has been purchased, and it will be sent in over the snow this winter. Assays of ore ran high in free gold. The blanket deposit here dips toward the body of the mountain. Between the Sunnyside and H. Y. groups is the Wisdom group, owned by Moore & Campbell and the Sunnyside people. F. W. Holcomb has eight claims between the H. Y. and the Dewey. He has 1,000 ft. of work, with good ore disclosed. The Mysterious Slide, owned by Martin Curran and others, of Boise, lies west of the Dewey on Mule creek. The work is in charge of Joe Davis, who has driven a tunnel 440 ft. to the blanket and 75 ft. into the ore, which runs from $10 to $12 per ton. The Navajo, on Divide creek, was sold by W. A. Douglas to Erie, Pennsylvania, people, who will develop it. W. C. Cooper, who has nine claims on the divide between Judian and Reardon creeks, has a vein on a contact of granite and limestone, carrying gold and silver ore. The Idaho Gold Mines Development Company has a group of seven claims on Rainbow peak, on which development discloses a vein carrying high values in gold. John L. Makeever, of Chicago, is largely interested.

The Twentieth Century Company is developing and building on Monumental creek above Roosevelt, the work being in charge of James R. Noss. The wagon road from Long valley to Roosevelt is completed, at this writing, to a point within 15 miles of the latter place, and it is likely that wagon haulage to Roosevelt from the outside world will be possible before winter sets in. When it is considered that everything in the way of machinery used in the district has been brought in by pack animals, the progress made may excite admiration. I went out by way of the new wagon road through Johnson and Reardon creeks to Scott valley, thence to Long valley. This route may be reached from Boise and Nampa direct or by way of Council and Meadows. The route from Council by Meadows, Warren and Smith creek is destined to be important because of the nearness to a railroad, and the fact that almost the entire route is through a mining section. The extension of the Pacific & Idaho Northern railroad from Council to Meadows is intended.

THE POTTER PROCESS.

By Donald Clark.

The difficulty of providing a suitable machine for the separation of sulphides from gangue by the Potter process was first overcome by G. A. Goyder, for many years analyst to the South Australian government. Mr. Goyder noticed that when the bubbles carrying the grains of sulphides from a slightly acidulated solution rose to the surface they broke, and the sulphides dropped back; when placed in a sloping test tube and heated the bubbles glided along the upper side of the tube to the surface, then they broke, and dropped the sulphides. He had a tube made with a pocket on the under side and found that a perfect separation could be made, the sulphides all dropping into the pocket, leaving the gangue at the bottom of the tube.

Fig 1

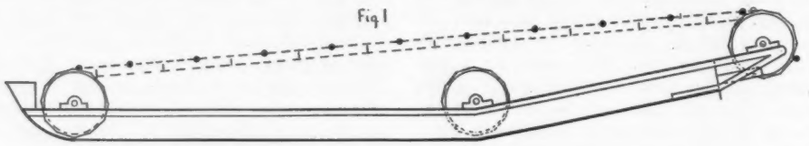


Fig 2

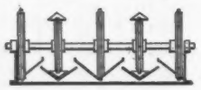
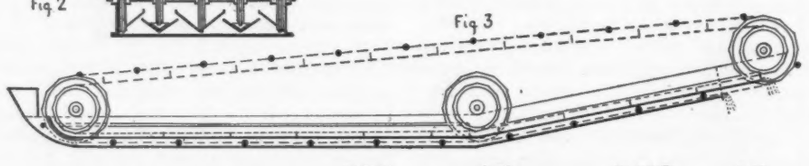


Fig 3



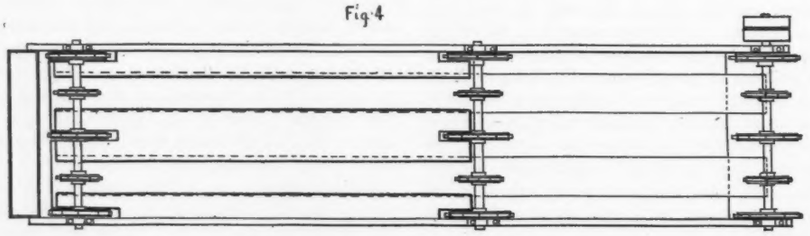
In conjunction with Mr. E. Laughton, the managing director of Block 14, Broken Hill, he constructed a machine, which, after numerous improvements, is now doing excellent work on a commercial scale. This consists of a rectangular vessel about 4 ft. wide, 16 ft. long and 9 in. deep; one end is curved and provided with a hopper for feeding crushed ore across the width of the vessel, the other end for about 6 ft. 6 in. is inclined upward at an angle of 10°. In this punt-shaped vessel is placed a frame of deflecting boards, shown in cross section in Fig. 2. It will be seen that the frame is made up of boards V-shaped in cross section and so arranged that when immersed in a liquid from which sulphides rise, the sulphides will glide along their under surfaces and pass through the small openings, as shown, when they will drop into two V-shaped launders provided with scrapers. The ore is fed in at the curved end and carried along by horizontal rods attached to a pair of parallel endless chains; by the time it has reached the inclined end of the machine the sulphides have all been separated and the gangue is carried forward out of the bath. The scrapers for the sulphides are carried by two independent chains driven by polygonal wheels on the same shafting as the wheels for driving the parallel chains to which the ore scrapers are attached. Much difficulty was at first experienced in getting a metal to stand the action of hot dilute sulphuric acid when exposed to the air. Copper was tried, but was eaten through in a fortnight; lead buckled; but ultimately an alloy containing 1 of antimony to 15 or 20 of lead was adopted. This is satisfactory. Sprocket wheels were first used, but gave trouble, owing to expansion and stretching of links. Flat-faced polygonal wheels are now used.

After numerous trials in Adelaide, four machines were erected at Broken Hill to work the tailings heaps at Block 14. These tailings were the residues of wet concentrating mills, but since the gangue consisted of garnet and rhodonite, having a specific gravity very close to that of blende, it was not possible to dress the blende, nor was it possible to get more than from 65 to 68 per cent of the lead. The values of these residues vary considerably, but they run from 15 to 30 per cent zinc, 5 to 10 per cent lead, and from 5 to 18 oz. silver. This material is now satisfactorily dealt with by these machines. The body of the machine is filled with a 3 to 3.5 per cent solution of sulphuric acid for a depth of about 6 in. or until the V-shaped launders are covered to the extent of an inch. The bottom of the vessel is heated by a small wood furnace having its flue along the horizontal portion of the vessel. The lead-antimony plate at the bottom is about 3/8 in. thick, and is supported by iron grids or bars, but otherwise it is in contact with the flame. The solution by this means is heated to about 180° F., the best temperature for the action being from 180° to 200° F. The tailings, or 'middlings,' as they are called, are screened through 35-mesh. Slime has been previously eliminated in the concentrating operations. The size of the particles treated is between a 35 and a 50-mesh, very little being finer. These are passed by a roller feed into the head of the machine, and are carried along the bottom by the rod scrapers. As the ore travels the sulphide of zinc at once rises and drops into the launders, and is scraped along at the same rate as the ore. When the tails come to the inclined end of the machine they are conveyed upward, a fine spray of clear water washing any adhering acid back to the trough; they then fall over the end of the machine and are conveyed away. The zinc sulphide is similarly washed, and drops out of the end of the V-launders into a bin. A fine stream of sulphuric acid is allowed to pass into the head of the machine to make up for that decomposed. The spray of wash-water suffices to make good that lost by evaporation and retention by the gangue and sulphides. The amount of sulphuric acid used varies, but on the average amounts to 40 lb. per ton of ore carrying 20 per cent zinc. The extractions are better than with any form of gravity concentrator working on the same grade material, even with a quartz gangue. If the material were all evenly graded through about a 40-mesh sieve a perfect extraction could be obtained; as it is, the amount recovered is seldom less than 85 per cent, often running up to 93 and 94 per cent of the total zinc content. Galena pure and simple does not appear to be raised; it remains with the gangue, but if attached to particles of blende it will be carried up. The grade of the concentrates is high, that is, the blende as recovered is of the same composition as in the ore, or about 75 to 80 per cent of ZnS with 15 to 20 per cent of isomorphous ferrous and manganous sulphide, the latter running about 1 to 2 per cent. Owing to adhering galena, the concentrates are never free from lead, containing from 2 to 8 per cent, in accordance with the grade in lead of the material treated. The concentrates run from 44 to 52 per cent zinc, and their silver contents are much higher than the ore treated. It is proposed to recover the lead remaining in the tails by jigging and vanning.

The machine described will put through a ton per hour. Upward of 2,000 tons had been dealt with at the date of my visit, and Mr. Laughton considered that all the preliminary worries of the process had been overcome, and he was sanguine of the process being applied not only to tailings, but, in many instances, to raw ores. Experiments have also been carried out on chalcopyrite ores, and a recovery of over 90 per cent of the copper secured.

Other machines have been devised to work the process; one known as Berry's gets over the trouble connected with links and wheels which constitute the weak points of Goyder's machine, by having a shallow cylindrical vessel with an annular trough round the side. An inverted conical deflector, which rotates, is placed in this and carries scrapers for ore and the sulphides which pass over into the trough. The vessel is heated and ore is fed at one point at the circumference; the scrapers carry it round to near the same point, when it is discharged through a slot connected with a hopper. The sulphides are similarly discharged. The machine works well, and has the advantage of having only one moving part.

Fig 4



Mr. Delprat, at the Proprietary mine, Broken Hill, densifies his acidulated solution with salt-cake, and claims that bisulphate of soda, and not sulphuric acid, is the active ingredient in his solution. For actual work he uses an inclined launder, in which the solutions are heated; the blende rises and flows away, while the gangue drops to the bottom of the launders and is discharged through a spigot. A considerable quantity of ore has been treated by this method with good results. A large plant is being erected and sulphuric acid is made by the Bradford-Carmichael process. Potter claims that Delprat has infringed his patent, so that details of the latter cannot be given at this stage because litigation is going on.

NOTES ON ZINC SMELTING.

BY AN OCCASIONAL CORRESPONDENT.

C. Ritter, in *Zeitschrift für angewandte Chemie*, June 10, 1904, states that the usual practice is to crush blende to 1 to 3 mm. size before roasting. When it is crushed to 0.5 mm. size, or finer, it is so loose and bulky and difficult to roast that the capacity of a given hearth is reduced 30 per cent. (It is well known in zinc smelting practice that in roasting slimes the output of a furnace of certain size is diminished.)

An experiment in distilling a sample of roasted blende showed a volatilization of 81 per cent of the zinc. In distilling a mixture of equal parts of roasted blende containing 25 per cent zinc, and calcined calamine, containing 15 per cent zinc, the volatilization of the zinc was 91 per cent. The conclusion is deduced, therefore that an addition of calamine promotes the distillation of roasted blende. (This idea is held by many smelters. In order to arrive at a true conclusion, however, identity of conditions should be carefully established.)

Pure zinc oxide can be completely reduced and volatilized.

H. Brandhorst, in *Zeitschrift für angewandte Chemie*, April 15, 1904, points out that the temperature at which zinc-blende is commercially roasted does not permit the formation of zinc sulphates to any important extent, the statements in the older metallurgical treatises to the contrary notwithstanding. (Certain conditions may lead to the formation of zinc sulphates, but they are surely decomposed before the end of the process and at temperatures less high than are often supposed to be necessary to maintain.)

The loss of zinc in the treatment of Silesian ores occurs chiefly in the residues. The loss by absorption in the muffles is apt to be overestimated. The blue coloration of old muffles is not necessarily an evidence of high zinc content. In many cases it is due to oxides of titanium, the titanic acid which some clays contain being reduced by zinc vapor. Such blue coloration is easily destroyed by strongly heating with exposure to air, the reduced oxides being then converted back into titanic acid.

The desulphurization of the ore is ordinarily carried to an unnecessary extent. Experiments in the distillation of eight different kinds of ore and mixtures containing various percentages of sulphur, one charge being a partially roasted blende, with 5.8 per cent sulphur as sulphide and 7.4 per cent sulphur as sulphates, performed under identical conditions at the ordinary temperature of the regular furnace, showed absence of all but traces of zinc in the residues in each case. The inference is that within tolerably wide limits the chemical composition of the charge is immaterial (so far as volatilization of the zinc is concerned), and especially in the case of ferruginous blende a small percentage of sulphur in the roasted ore is harmless. (There is considerable evidence in practice to support this view.) The explanation of the fact that certain zinc ores are more difficult to reduce than others, is to be found in their physical differences. It is evident that a heavy but porous material can be reduced in a shorter time than a sintered one. The smelter rightly lays stress on the value of a soft, heavy ore. Ferruginous blendes, on the other hand, often give poor extractions, because they become sintered during the roasting and therefore are rendered less porous than before.

AMERICAN INSTITUTE OF MINING ENGINEERS.

The following circular has been issued from the Secretary's office in New York:

As already announced, in Circular No. 4 of 1904, the eighty-seventh meeting of the Institute will be held in the iron and copper regions of Lake Superior, beginning at Duluth, Minn., on Wednesday, September 14, and continuing at Houghton and Ishpeming, Mich., with a supplementary optional excursion to St. Louis, and sessions in that city.

No general arrangements with railroad or steamship companies, securing reduced rates for members and guests attending this meeting, have been found practicable, because such arrangements require a guaranty of the return home of at least 100 certificate holders by the route taken in going, and without any stop on the way—a condition which the plan of this meeting obviously precludes. On the other hand, the Institute cannot officially make contracts for transportation. Under these circumstances, Mr. Theodore Dwight, who has already organized and managed several extensive excursions of members and guests of the Institute, has undertaken a similar task on this occasion, and has arranged an excursion, as follows: Leaving Buffalo by steamer *Northwest* September 10, at 9 p. m.; Cleveland, September 11, at 9 a. m.; Detroit, September 11, at 3.50 p. m.; Mackinac Island, September 12, at 11.30 a. m.; Sault Ste. Marie, September 12, at 6.30 p. m., and arriving at Duluth on Tuesday, September 13, at 8 p. m. Members and friends desiring to secure passage on this steamer from either of the points named can do so at rates below the ordinary fares by immediate application to Mr. Dwight, at this office.

Persons intending to join the party at Duluth and to take part in the excursions to the iron and copper regions should likewise communicate at once with Mr. Dwight, in order that he may close the necessary contracts for special trains, sleepers and accommodations *en route*, and also that the several local committees may be able to provide for their entertainment. Ladies are not expected to take the trip to the Mesabi range (September 16 and 17), but special entertainments will be provided for them in Duluth by the Ladies' Reception Committee for that period. On Sunday night, September 18, the entire party will leave Duluth by special train for Houghton, Ishpeming and Chicago, stopping two days at Houghton and one day at Ishpeming, and arriving in Chicago September 22. This special train will be side-tracked at all places visited, and the sleeping-cars will be available for lodging and the dining-car for meals until arrival in Chicago, when the excursion organized by Mr. Dwight will end.

The following papers have been announced for presentation at the Duluth sessions of the Institute:

1—Biographical Notice of Prof. William H. Pettee, by Dr. R. W. Raymond, New York City.

2—Biographical Notice of C. Le Neve Foster, by T. A. Rickard, New York City.

3—General Account of Lake Superior Geology, with Special Reference to the Districts to be Visited in Connection with this Meeting, by Prof. C. K. Leith, Madison, Wis.

4—Some Special Forms of Blast-Furnace Charging-Apparatus, by T. F. Witherbee, Durango, Mex.

5—Some Requisites for Obtaining Better Results from a Modern Blast-Furnace, by David Baker, Philadelphia, Pa.

6—Casting-Machines for Pig-Iron, by E. A. Uehling, New York City.

7—Appraisal of the Value of Mineral Lands with Especial Reference to Coal Lands, by Dr. H. M. Chance, Philadelphia, Pa.

8—The Concentration of Gold and Silver in Iron Bottoms Reduced from Highly Ferruginous Copper Mattes, with Notes upon the Metallography of Mattes, by Myrick N. Bolles, New York City.

9—The Commercial Wet Lead-Assay, by H. A. Guess, Silverton, Colo.

10—The Genesis of the Diamond, by Gardner F. Williams, London, England.

11—The Investigation of Alaska's Mineral Wealth, by Alfred H. Brooks, Washington, D. C.

12—Moore Slimes Process, by George Moore, Salt Lake City, Utah.

13—Fire Brick Industry, by Weber, Ithaca, N. Y.

14—The Process of Crushing in Cyanide Solution as Practised in the Black Hills, South Dakota, by Charles H. Fulton, Rapid City, South Dakota.

15—Notes on the Flow of Gas from Orifices, by Prof. W. R. Crane, Lawrence, Kansas.

16—A Geological Cross-Section Through the Western Cordillera Along the Rio Huasco, by S. H. Loram, Valparaiso, Chili.

17—Centrifugal Ventilators, by R. V. Norris, Wilkesbarre, Pa.

18—Cyaniding-Practice at the Maitland Properties, South Dakota, by John Gross, Maitland, South Dakota.

19—The Equipment of a Laboratory for a Smelting-Plant, by Herbert Haas, Ingot, Cal.

20—Superficial Blackening and Discoloration of Rocks, Especially in Desert Regions, by Prof. William P. Blake, Tucson, Ariz.

21—Report of a Committee to Co-operate in Standardizing Abbreviations, Symbols, Punctuation, etc., in Technical Papers.

22—The Taviche Mining District, near Ocotlan, State of Oaxaca, Mexico, by Dr. H. M. Chance, Philadelphia, Pennsylvania.

23—The Coals and Cokes of Peru, by J. Morgan Clements, New York City.

24—Evidences of Plication of the Rocks of Cananea, Sonora, by Prof. William P. Blake, Tucson, Arizona.

The majority of these papers will be, as usual, read by title, or presented in brief oral abstract only. Printed copies of many of them will be on hand at the sessions. Authors intending to be present and desiring to have time assigned to them are requested to notify the Secretary in writing.

There will be no general distribution of pamphlets by mail before September; but members desiring to see any of the papers in the above list, for the purpose of discussion at the meeting, are requested to send immediate notice to the Secretary, who will forward in reply advance copies of the papers called for, if they are in print.

There are also a large number of contributions in hand for presentation, in discussion of former papers, on the subjects of iron blast-furnace practice, commercial specifications for various forms of iron and steel, the briquetting of minerals and fuel, the employment of electricity in mines, the metallurgy of copper, the use of concrete in mining and metallurgical engineering, etc., etc. Most of these contributions have been mailed to members (chiefly in the pamphlet-lots of May and July); but copies will be sent upon individual application, on the conditions stated above concerning papers. The

discussion of topics connected with iron and steel will have special preference at Duluth, in view of the approaching October meeting of the Iron & Steel Institute in New York. In accordance with an agreement between the councils of the two institutes, all papers and discussions in this department presented at the meeting of either will be freely communicated to the other, for further discussion or re-publication. Contributions concerning the mining of iron ore, and the manufacture, physical qualities and equitable classification of iron and steel products, are therefore earnestly invited. On these or any other subjects, time will be reserved in the sessions upon sufficiently early notice.

It is expected that a session will be held at Houghton, the papers and proceedings of which will afford valuable aid to members visiting the copper region.

One or two supplementary sessions will be held at St. Louis, beginning on Monday afternoon, September 26. Since the Lake Superior excursion ends at Chicago on the preceding Thursday, this arrangement leaves members free to spend a day or two in Chicago or to go immediately to St. Louis, and spend their time in studying the Exposition. No special arrangements have been made for this brief trip, but if a sufficient number desire to make it at one time, Mr. Dwight will endeavor to secure for them a special sleeping-car. Those who desire to stop in Chicago will be introduced to the Western Society of Engineers, which has cordially offered to furnish advice and assistance with regard to the many works of professional interest in that city.

The following papers are announced for the St. Louis sessions:

The St. Louis Exposition, by Pierre Chouteau, St. Louis, Mo.

The Department of Mines and Metallurgy of the St. Louis Exposition, by Dr. J. A. Holmes, St. Louis, Mo.

The United States Fuel-Testing Plant at the St. Louis Exposition, by E. W. Parker, Washington, D. C.

The Lead Resources of Missouri, by Arthur Thatcher, St. Louis, Mo.

The Metallurgy of Zinc in the Joplin District, by Hermann C. Meister, St. Louis, Mo.

Ore-Dressing Practice in Missouri, by O. M. Bilharz, Flat River, Mo.

The Coal Resources of Missouri, by B. F. Bush, St. Louis, Mo.

The Fire-Clays of Missouri, by H. A. Wheeler, St. Louis, Mo.

These papers are intended to facilitate the study of the professional features of the Exposition. It is expected that most or all of them will be distributed in printed form at the St. Louis sessions; but copies cannot be obtained in advance from this office.

Visiting members will be also advised and assisted to see the most instructive technical exhibits, among which the coal-testing plant installed by the United States Geological Survey (and comprising working apparatus and laboratories for scientific investigation of the washing, caloric efficiency, gas-producing and coking qualities, briquetting and chemical analysis of coals) deserves special mention.

The St. Louis Local Committee (H. A. Wheeler, Secretary, headquarters block 74, Mines and Metallurgy Building, St. Louis Exposition) will undertake to secure for members (upon notice in advance, with particulars as to the accommodations desired) safe and comfortable lodgings. There will be no hotel headquarters at St. Louis. The headquarters of the Institute will be at the address above given, and the sessions will be held in the same building.

No arrangement has been made for the return of members from St. Louis to their homes. It is expected that they will, after staying at the Exposition as long as they choose, make their own further arrangements.

JADE IN NEW ZEALAND.—Until now little has been done in New Zealand in the commercial production of jade or greenstone. Recently attention has been directed to a lode occurrence of the mineral at Milford Sound, and as results obtained have been satisfactory, a company, under the name of the Milford Sound Greenstone Company, with a capital of £10,000, in £1 shares, is to be formed to work the deposit. Up to a very short time ago, the only source of the stone in New Zealand was in sluicing claims. The mineral takes a beautiful polish, and is highly valued in China and some other eastern countries.

USES OF FLUORSPAR.—There are three main uses for fluorspar. The highest grade, containing less than 1 per cent of silica, and white in color, is sold, either ground or in lump, for use in the enameling, chemical, and glass trades. It brings the highest price: from $8 to $10 a ton unground and $11.50 to $13.50 ground. The second grade of spar is used in steel making, and is sold unground as lump or gravel. It is demanded for open-hearth work because of the great fluidity which it gives the slag. At present about 20,000 tons are used annually in this work, at a cost to the user of from $6 to $8 a ton. The lowest grade of spar, including all running over 4 per cent silica, or spar mixed with calcite, can be used in foundry work, and while the price is and always must be low, there is possible an almost unlimited market.

GYPSUM IN UTAH.—According to Mr. J. M. Boutwell, in 'Bulletin 225' of the United States Geological Survey, the deposit of gypsum in Juab county is the largest well-known deposit of rock gypsum in Utah, and forms the entire mass of a prominent spur at the entrance to Salt Creek valley. The exposed portions of this body are about 300 ft. thick, 500 ft. high along the bedding, and at least 700 ft. long on the strike. Several other deposits of value are known in the Salt Creek valley, east of the main body. The most important of these is on the north side of the creek, about one-half mile east of the Nephi plaster mill. They include rock gypsum of good grade and impure varieties. The great body at the mouth of the valley is, however, the only gypsum deposit in Utah now exploited to any considerable extent. It was known before the town of Nephi was settled, and has probably been known to the whites for nearly 80 years. About 35 years ago a claim 600 by 1,500 ft. in dimensions was formally located, and in 1882 this was patented by John Hague and others under the name of the Juab Plaster & Mining Claim. Small shipments were made for years. As demand increased, the owners incorporated a company and erected the nucleus of the present efficient plant, which, though not extensive, is very complete. Its output averages 36 tons of plaster a day, and between 7,500 and 10,000 tons a year. This includes dental, casting, finishing, land, and hard plaster.

RECENT LITERATURE ON ECONOMIC GEOLOGY. XXIX—IRON ORES.

By EDWIN C. ECKEL.

Origin of the Magnetic Iron Ores of Iron County, Utah. By E. P. Jennings. *Transactions,* American Institute of Mining Engineers, 1904.

Descriptions of large hematite and magnetite deposits occurring in Iron county, Utah, about 275 miles south of Salt Lake City, with a novel theory of origin.

"The magnetite occurs in nearly vertical dikes in diorite-porphyry; and also as sheets in overflows from these dikes, very similar to the overflows of lava so common in southern Utah. In some instances the remnants of the sedimentary beds remaining in contact with the ore form one of the walls. The presence of these thin beds of limestone, or quartzite, has led a few observers to conclude that the ore is in the form of a contact deposit, but as a matter of fact it is enclosed in syenite walls below the sedimentary beds.

"The ore of all these outcrops is a massive black magnetite without trace of crystallization, except in vugs and joints. It is strongly magnetic, and natural magnets or lodestones are not uncommon. The chief impurities are silica in the form of quartz and chalcedony, and apatite. * * *

"Where the sheets are intruded betweene the porphyry and limestone, the magnetite has been converted into hematite, which differs entirely in physical character from the original magnetite. The hematite is of the soft, earthy variety, and is lower in iron and higher in lime content than the magnetite. * * *

"My conception of the origin of these magnetic iron ores is that they are the result of an extreme basic differentiation from a basaltic magma in the deep, and, in a molten condition, have been forced to the surface through fissures that were formed contemporaneously with the eruption of the magnetite, in a manner similar to the formation of basaltic and other eruptive dikes. When the quantity of material was more than sufficient to fill the fractures, it overflowed in the form of sheets. When the fractures extended into the overlying sedimentary beds they also have been filled with ore. * * *

"Both the magnetite and the hematite vary in quality from very pure ores, high in iron and low in phosphorus and sulphur, to silicious ores of no commercial value. The ores contain traces of copper, but no titanium. The composition of the better grades of magnetite is as follows: Fe, 62 to 68 per cent; P, 0.01 to 0.48; S, 0.007 to 0.03, and Cu, 0.002 to 0.08 per cent. The hematites yield on analysis: Fe, 40 to 61 per cent; P, 0.03 to 0.4; S, 0.01 to 0.1, and Cu, 0.003 to 0.09 per cent.

This is perhaps the first time since the studies of Emmons on the Adirondack magnetites (1842) that a body of non-titaniferous magnetite has been discussed as a dike.

Notes on Recent Mineral Developments at Minerville, New York. By Heinrich Ries. *Twenty-second Annual Report* New York State Geologist, pp. 125-126.

Brief discussion, mostly of recent changes in ore-dressing practice.

The Port Henry, New York, Iron Mines, 1849-1903. Pamphlet, quarto. 21 pp. Witherbee, Sherman & Co., New York city, 1904.

Reprints of two interesting papers on this great mining property. The first paper is from the *American Railroad Journal* of 1849, the second from the *Iron Age* of 1903.

BOOKS REVIEWED.

The South Wales Coal Annual, 1904. Edited by Joseph Davies. Cardiff, Wales; Joseph Davies. Pages, 272.

This annual contains a store of tabulated information for all persons interested in the Welsh coal industry. The information relates to the coal output of Wales for the past 50 years, and to wages, railway and ocean freights, prices, exports, foreign duties on coal, prices of mine timber, etc. A paper on 'Electricity in Mining' is included and there is an excellent account of the Conciliation Board that tries to adjust differences over wages between employers and miners. The statistical information is well arranged.

A Systematic Handbook of Volumetric Analysis. By Francis Sutton. Philadelphia, 1904; P. Blakiston's Sons & Company. Pages, 616; illustrated. Price, $5.

The appearance within a few years of another edition of this standard work is sufficient evidence of the esteem in which Mr. Sutton's handbook is held by chemists. The number of workers at volumetric processes is now so great that, as the author states, it is simply impossible to verify all suggested methods. Hence Mr. Sutton has used, as in other editions, short abstracts of processes published in various periodicals devoted to chemistry. This edition contains more matter, by reason of numerous valuable additions to methods described, but as the size of the page has been increased, the number of pages has been reduced, thus keeping the work what it has always been, a portable and convenient reference book. The author covers a wide field, taking up the determination of certain organic compounds and gas, water and sewage analysis, in addition to the determination of the acids and the elements. The index has been carefully revised and the typography of the book is up to the standard of preceding editions.

West Virginia Geological Survey, Vol. IA. Petroleum and Natural Gas. I. C. White, State Geologist. Morgantown, W. Va., 1904; printed for the State. Pages, 625. Price, in cloth binding, $1.25.

The report is supplementary to Vol. I, treating of the same subjects, the edition of which has been exhausted. In its preparation, material that appeared in Vol. I has been freely used and in addition are given many records of gas and oil wells. The publication of these records is to put them in available form for use, since they not only give measurements of oil-bearing formations, but show the thickness and depth of any coal-beds pierced. This knowledge, as Mr. White points out, will be of high value at that distant day when the oil and gas are exhausted, and an accurate knowledge of deep-lying coal-beds may be desired. It is hoped that in some way better records can be secured of the immense amount of drill-work now being done in the State by large oil and gas companies. The report contains well records from the Pennsylvania oil-fields, and also information on the methods of measuring the flow of gas, analyses of West Virginia gas, etc.

Brief sketches of the stratigraphy of the oil and gas-bearing rocks in each county are given in connection with the records of wells. These records show that there are in West Virginia several well-defined oil and gas horizons between the Permian rocks at the top of the Carboniferous and Corniferous limestone at the bottom of the Devonian. There are possibly 23 'sands,' the lowest being the Bayard in the Venango oil sand group of the Upper Devonian and the highest the Carroll sand in the Monongahela formation. The Silurian rocks, particularly the Trenton and Medina beds, are not known to be productive in the State in spite of their great productiveness in Ohio.

All the oil produced in the State is equal to the highest grade of Pennsylvania petroleum, having a paraffine base, but varying greatly in color and specific gravity. The highest gravity petroleum in the world, 63.5° B, occurs in the salt sand of the Volcano region in Ritchie county. The natural gas also contains paraffine hydrocarbons. Six careful analyses of gas from six different sands showed: CO_2 in no case over 1 per cent; CO below 0.5; O below 0.3 and H below 0.2 with no NH_3H_2S or CS_2; total paraffines averaged 95 per cent, and the fuel value averaged about 1,100 B. T. U. per cu. ft. Regarding the occurrence of natural gas and petroleum Mr. White states that every gas and oil pool in the State demonstrates the truth of the anticlinal theory.

Mr. White has much to say of the gross carelessness with which the State's mineral resources have been wasted. The production of petroleum, which exceeded 16,000,000 bbl. in 1900, is declining and the State has already lost $150,000,000 worth of natural gas within 10 years by escape into the air and half as much more by wasteful methods of burning. Thus in Lewis county, several of the largest wells in the State were allowed by their owners to blow off 10,000,000 to 20,000,000 cu. ft. daily for months with no attempt to shut them in. Evidently prompt action is needed, and longer delay by the legislature will be criminal, for even the average West Virginia legislator probably knows by this time that wasted supplies of natural fuel cannot be replaced.

Mr. White has done his work well; but it is a pity that a report containing so much interesting data should be so poorly printed.

BOOKS RECEIVED.

In sending books for notices will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of this JOURNAL.

The Ozone Treatment of Public Water Supplies. By James Howard Bridge. New York; the Aldine Book Company. Pamphlet, 16 pages.

Jahrbuch der Chemie. Thirteenth Year, 1903. Edited by Richard Meyer. Braunschweig, Germany; Friedrich Vieweg & Sohn. Pages, 596; illustrated.

Transactions of the American Foundrymen's Association, 1904. Dr. Richard Moldenke, Secretary. New York; published by the Association. Pages, 72; illustrated.

Carborundum. By Francis A. J. Fitz-Gerald. Translated into German by Max Huth. Halle-a-S., Germany; Wilhelm Knapp. Pages, 44; illustrated. Price (in New York), 70 cents.

United States Geological Survey. The Production of Barytes in 1903. By Joseph Hyde Pratt. Pages, 10. *The Production of Manganese Ores in* 1903. By John Birkinbine. Pages, 32. *The Production of Lithium in* 1903. By Joseph Hyde Pratt. Pages, 8. Washington; Government Printing Office.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the Editor.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Concerning Pools.

Sir.—Your iron market reports recently have had a good deal to say on the various pools and their policy. These pools are now, of course, controlled by the largest producer, and their official action must, in the end, be controlled by its wishes. So far as we have gone, the results are not very favorable. Of course, when business was active, and everybody wanted all the iron and steel he could get—usually a little more—there was no trouble. Prices were kept at a tolerably even level, and not, apparently, too high; advances over the pool prices were obtained in a good many cases, but they were disguised as premiums for early delivery. When business began to fall off and new orders were below capacity, the matter was altogether different. At first the leading interest, whose managers did not seem to have anticipated any such change, had no policy at all, so far as outsiders could see. It was simply drifting. Later a policy was developed, and that was to maintain prices by sharply curtailing output.

This, however, did not suit other members of the pools. They could not vote it down, so they—or some of them—simply ignored it. They took orders, to keep going, and took them for what they could get. Naturally, this rather spoiled the pool arrangements. "It takes fifty men to put up prices, but one man can knock them down," is an old saying. Apparently the course of proceedings now is for prices to go down—and then the pool meets, and solemnly ratifies the fall. Of what use, then, is the pool? That is not an unnatural question.

We have had pools of all kinds in this country. Everyone remembers the old nail pool, which finally came to an end, because everyone, who had capital or credit enough to buy a few machines, started a nail mill and waited to be bought out. The business of starting new mills was lucrative, but the pool finally came to the end of its collective purse, and had to give it up. The game could not be played now in just the same way, but there are signs that something like it may be tried.

This year is a hard time for pools and combinations. The independent producing companies are getting their chance. It may be that the big producer will turn and try to crush them by comprehensive cutting; but it does not look as if it would dare to try that. The other plan is to buy off opposition; but to that an end must come in time. There is a third way, which does not seem to have been suggested; that is, to meet the situation in a rational way, and recognize the fact that no pool or combination has yet been organized that has been able to disregard the laws of supply and demand.

IRON-MASTER.

Pittsburg, Sept. 3, 1904.

In its mining operations in the fiscal year 1903, the Alaska-Treadwell used 315,087 ft. lumber, 1,243,865 lb. powder, 2,735,995 ft. fuse, 502,750 caps, and 45,400 lb. candles.

ABSTRACTS OF OFFICIAL REPORTS.

Arizona Copper Company, Ltd.

This company, which has its headquarters in Edinburgh, Scotland, owns an important group of copper mines at Clifton, in Graham county, Arizona. The latest report is for the half-year ending March 31, 1904. The financial report, as stated in sterling from the Edinburgh office, shows mine profits amounting to £128,831. General expenses and taxes were £9,452, leaving a balance of £119,379. Net earnings of the Arizona & New Mexico Railroad, owned by the company, were £39,842, making a total of £159,221. Payments were £10,505 for interest and £12,265 for dividends on preferred stock, a total of £22,770, leaving a balance of £136,451. Out of this, dividends of 1s. 5d. per share were paid, amounting to £107,659, leaving a surplus of £28,792. Adding £14,863 brought forward from previous half-year, made a total of £43,655 surplus. Expenditures on capital account for improvements to mine and railroad were £11,989.

The mine report says: "The electric haulage system adopted is that of the overhead trolley. Power is furnished by a 146-h.p. Crossley gas engine, which drives a 100-h.p. generator, which furnishes the electric current at the safe voltage of 225. Three motors are employed, all of 10 h.p. They are strongly built, dust proof, and apparently perfect in every detail. So far, they have worked without giving a particle of trouble. Each motor will easily haul 40 tons to the trip. Careful tests have shown that they all exceed their rated capacity. The system has, in the meantime, been applied only to the Humboldt tunnel level, which is the main working level, but it will be extended whenever it becomes necessary to do so. The road-bed is perfect in grade, and it is covered with 35-lb. rails. Electric lights placed judiciously furnish all the light necessary. A single track is used; this runs straight into the mountain for a distance of 600 ft., when it branches into a wide loop, which taps all workings. The system has not been long enough in operation to enable us to give exact figures. It is, however, more economical than the old system, and as it will enable us to do all of our mining in the day time, it is reasonable to expect that it will indirectly enable us to mine more economically. . . . "A glance at the whole extended mineral field is enough to assure one of the thoroughly satisfactory condition of the property. The immense reserves available at practically all points not only insure future supplies, but they place it in our power to ease up on the work and expense of development whenever, by reason of bad times, or owing to other causes that should become necessary. Mining is being conducted on broad, systematic lines, properly established and easily maintained. The electric haulage is a success. It may indirectly, as well as directly, have an influence upon costs. Light air-drills are about to be introduced in a number of our slopes. Developments of prime importance are being conducted in the Humboldt, in the North extension of Longfellow, in the Clay Tunnel and at the Coronado. In the Humboldt pay ore has been placed in sight at a depth of 150 ft. below the lowest present workings. The ore exposed justifies the opening of a new level, which will be known as the second or 255-ft. level. It will form an underground railway 1,200 ft., more or less, in length, which will cut the main ore body at a depth of 600 ft. beneath the surface. This work, which starts from the Humboldt shaft, has now been commenced. It ought to cut pay ore within 300 feet; further in it should pierce other likely ground, and finally it will connect with the main ore-body, which will then be systematically developed."

In the smelter 49,645 tons of copper ore and concentrates, and 1,491,441 lb. of copper derived from leacher were smelted, resulting in a gross yield of 14,756,742 lb., which was equal to a monthly average of 1,229.7285 tons. Of this, 6,633 tons were obtained from the smelting of copper ores and concentrates, representing an average yield of 13.35 per cent. In the concentrator 231,552 tons of ores were treated, and yielded 35,093 tons of concentrates. Of the 231,552 tons treated, 50,436, or 21.78 per cent, were obtained from Metcalf group; 148,782 tons, or 64.25 per cent, from the Humboldt tunnel workings, North extension of Longfellow and Yavapai; and 32,334 tons, or 13.97 per cent from Coronado. No. 1, 3 and 4 concentrators treated 124,629 tons, and No. 5, 58,242 tons of sulphide ores, while No. 2 concentrator disposed of 48,681 tons of oxide ores, which were obtained from Metcalf and mines tributary to that field. On an average, 6.6 tons of raw ore produced 1 ton of concentrates, as against 6.81 for the last six months.

The operation of the acid plant resulted in a yield of 1,826 tons of sulphuric acid (H_2SO_4). During the previous half-year the output of acid was 1,551 tons. The leaching plant treated 43,049 tons of tailings, and produced 1,488,246 lb. copper. As compared with the previous six months, the consumption of tailings shows an increase of 8,945 tons, and the production of copper was increased by 55 tons.

In the smelting plant a Corliss steam engine was installed in the blower-room, with capacity to drive two large blowers. The power in the blower-room was only sufficient to operate two furnaces, so that it is now possible to operate all three of our blowers and three furnaces, and have a reserve power in case of accident to the steam engine. A No. 9 Roots blower was also installed in the blower-room, making three blowers in all.

In the bessemer plant a 200-h.p. steam engine has been installed to drive No. 1 air-compressor, as a reserve in case of accident to No. 1 power-house. This engine was transferred from No. 3 concentrator, where it was in use prior to the operation of that mill by electric power. This plant is in good condition. As the converters are liable to a great many accidents, it has been found necessary to order another converter stand.

The directors' report says: "In consequence of the coal-miners' strike in Colorado, high prices had to be paid during the six months for coke and coal, the cost of copper being thereby increased. To avoid the danger of a shortage of fuel, which would have necessitated a shutdown of their works, the various companies operating in the district at the beginning of the strike purchased large stocks of coke and coal. This materially benefited the traffic of the Arizona & New Mexico Railway, the net returns from which for the half-year are very satisfactory. The copper market has remained steady during the past half year, and the company has realized satisfactory prices for its production. The question of the erection of an additional concentrating plant has been engaging the attention of the directors for some time past. When Sir William Menzies and Mr. Salvesen visited Clifton in the spring they discussed this matter very fully with Mr. Colquhoun and Mr. Veitch, and it was decided to delay increasing the plant until developments at Coronado and elsewhere are further advanced."

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc. Preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Lepidolite.—Can you tell me anything about lepidolite, or lithia-mica? I believe I have found a deposit.—C. S. S.

Answer.—According to Merrill—'Non-Metallic Minerals'—this variety of mica is much more rare than any of the others described. While in a few instances it has been reported as accompanying muscovite in certain granites, as those of Elba and Schaistausk, its common form of occurrence is in coarse pegmatitic veins, where it is associated with muscovite, tourmalines, and other minerals of similar habit. As a rule, it is readily distinguished from other micas by its beautiful peach-blossom red color, though sometimes colorless, and to be distinguished only by the lithia reaction. The folia are thicker than those of muscovite and of small size, the usual form being that of a scaly granular aggregate. At Auburn, Maine, it is found both in this form and forming a border a half inch, more or less, in width about the muscovite folia. The more noted localities in the United States are Auburn, Androscoggin county; Hebron, Paris, Rumford, and Norway, Oxford county, Maine, where it is associated with beautiful red and green tourmalines and other interesting minerals; Chesterfield, Mass.; Haddam, Conn.; the Black Hills, South Dakota; and near San Diego, Cal. The most noted foreign locality is Zinnwald, Saxony, where the mineral occurs in large foliated masses together with quartz, forming the gangue minerals of the tin veins. It is also found in Moravia.

The mineral is of value chiefly as a source of lithium and the lithium salts.

Norway produces a large quantity of granite and other stones for export, the greater part going to the United Kingdom and Germany. The chief center of the trade is in southern Smaalen, and the shipping ports are Fredrikstad, Fredrikshald and Sarpsborg. The total exports in 1903 were 165,279 tons.

The production of petroleum in West Virginia has passed its maximum, though the output now equals that of Pennsylvania and New York combined, but the State will probably continue to lead in the production of 'white sand oil,' the best petroleum in the world, since it contains much more such oil territory than Pennsylvania, Ohio and Kentucky.

Petroleum with an asphaltic base appears to be stored in larger reservoirs of porous rock than that with a paraffine base, and is also found in rocks that are geologically younger. In West Virginia fairly good oil territory is estimated to average 5,000 bbl. of 42 gal. each to the acre, while at Spindle Top, Texas, an area of less than 200 acres has produced close to 20,000,000 bbl. The asphaltic petroleum deposits at Baku, Russia, are enormously productive.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

WHERE ONE SELLS LAND HE IS LIABLE ON CONTRACT FOR VALUE OF MINERAL.—Where the owner of land gave another the exclusive right to prospect for gold on same, and agreed to give a half interest in all the gold he might locate, with mining privileges, and the latter, at considerable expense, developed gold on the land, he was entitled to a half interest therein, and if the owner afterward sold the land to an innocent purchaser, the party locating the gold had a right of action for half the value thereof.—Brown v. Bowman (46 *Southeastern Reporter*, 410); Supreme Court of Georgia.

WHERE TIME IS THE ESSENCE OF THE CONTRACT FAILURE WORKS FORFEITURE.—Where a mining lease for two years stipulates that the lessees shall sink the shaft 200 ft. during the term, the first 100 ft. to be sunk by a day 14 months after the making of the lease, relief from forfeiture for failure to sink the first 100 ft. by the time stipulated will not be granted where the work was not commenced until 11 months after the lease was made, though this was early enough, but for the encountering of running ground; the fact that it was sunk 100 ft. in nine days will not relieve them, as the sinking of the shaft said distance within such time was of the essence of the contract. If they continue to mine after notice of forfeiture they are not trespassers, though mistaken in their rights, and are entitled to expenses for mining the ore.—Montrozona Gold Mining Company v. Thatcher (75 *Pacific Reporter* 595); Colorado Court of Appeals.

WHEN FORFEITURE WILL NOT BE DECREED FOR NON-COMPLIANCE WITH LEASE.—In all oil and gas leases a covenant to "protect the lines" and "well develop" the land is implied, and the fact that such covenants are expressed in the same general terms adds nothing to the lessees' obligation, and the lease cannot be forfeited for a breach of such covenants where in good faith they have done what in their judgment was required to comply therewith. A court will not decree a forfeiture on the ground that the lessees have abandoned development of the land, where up to the time of filing the bill they have drilled the full number of wells specifically required by the lease and are still in possession and operating the same, though the drilling was not done at the time agreed. If there has been failure it should be in an action for damages for breach and not a suit to declare forfeiture.—Kellar v. Craig (125 *Federal Reporter*, 630); United States Circuit Court of Appeals, West Virginia Circuit.

FEDERAL COURT MAY MAINTAIN JURISDICTION AND SETTLE DISPUTE.—A lessee under an oil and gas lease, although out of possession, may maintain a suit in equity in a Federal court to protect his rights, by enjoining the removal of oil or gas from the premises by the claimant under another lease, the effect of which would be to destroy his estate; and having acquired jurisdiction for that purpose, the court could retain it to settle the question of title as between the parties, and to cancel the lease of the defendant as a cloud on the title of complainant. The fact that lessor had received bonds on which no payments had been made did not affect the right of lessor, where the lease had been terminated by the act of the lessees. Where no time is stated, work should be commenced within a reasonable time, and a lapse of four years without work entitles lessor to treat contracts as abandoned and lease to others.—Logan Natural Gas & Fuel Company v. Great Southern Gas & Oil Company (126 *Federal Reporter*, 623); United States Court of Appeals, Ohio Circuit.

PATENTS RELATING TO MINING AND METALLURGY.

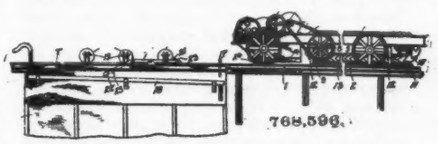
UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending August 30, 1904.

768,576. HEATING-FURNACE.—James W. Arnold, Covington, Ky. In a heating-furnace for iron and steel, an automatically-operated charging-door located in the crown of the furnace, a hearth-section of substantially the area of the charging-door, located beneath the door and adapted to withstand without injury the impact of the charged metal, other hearth-sections adjacent to said first-named section, and a door for removing the heated metal.

768,596. FURNACE-CHARGER.—William H. Freeland, Ducktown, Tenn. In a furnace-charger, the combination with a furnace having a charging opening,



768,596.

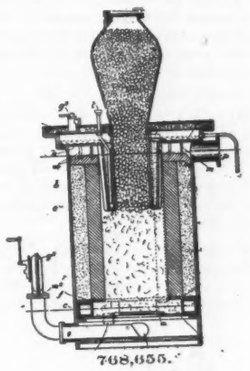
of a movable cover normally closing said opening, a traveling conveyer adapted to dislodge the cover and discharge its contents into said opening, and means for moving the conveyer along the opening to distribute the charge.

768,624. APPARATUS FOR RECOVERING VALUES FROM SAND OR DIRT.—Charlotte M. Poppenberg, Brainerd, Minn., administratrix of Cornelius G. Poppenberg, deceased. In an apparatus for recovering values from sand and dirt, the combination of a casing, plurality of quicksilver-holders arranged one above the other, and having depressions provided with sharp edges, and spaces between said depressions for the downward passage of sand or dirt, means for supporting the holders in the casing in such manner that spaces are formed between the sides of the holders and the casing for the downward passage of sand or dirt, and deflectors arranged below the upper holders so as to receive sand or dirt from the said spaces and conduct the same to the next lower holder.

768,653. MINE-GATE.—John P. Cowing, Cleveland, Ohio, assignor to The American Mine Door Company, Cleveland, Ohio. The combination with a trolley-wire and car-rails, of depressible rails carried by the car-rails, a gate-frame mounted adjacent the rails and supporting said trolley-wire, a rotatably-mounted curtain carried in said frame, a contact member mounted near the base of the frame, means actuated by the depressible rails being electrically connected with the car-rails adapted to contact with said member upon depressing the depressible rails, and electrically-operated means in circuit with the trolley-wire adapted to raise the curtain upon the depression of the last-named rails.

768,679. MACHINE FOR MOLDING BUILDING-BLOCKS.—Levi P. Normandin, Jackson, Mich., assignor of three-fourths to William F. Cowham, Jackson, Mich. In a machine for molding blocks the combination with a bed, of an articulated frame thereon forming an oblong rectangular mold, and comprising end plates pivotally attached to the bed, a connecting-plate hinged to the free end of one of said end plates, and having a clamping engagement with the free end of the opposite end plate, a plate rigidly clamped upon the bed parallel to said hinged plate, and a loose plate extending between said rigid plate and said hinged plate and provided with rearwardly-extending bearings abutting against one of said end plates, whereby a substantially square mold is formed of lesser length than said oblong rectangular mold.

768,655. GAS-PRODUCER.—William J. Crossley and Thomas Rigby, Manchester, England. In combination, a steam chamber, a fire-grate, a primary air-supply for the producer, a secondary air-supply passing



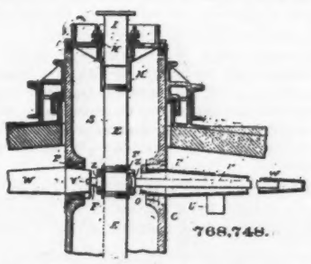
768,655.

through the steam-chamber so as to vary the proportion of steam to air corresponding to the load and means for delivering the primary air and secondary air and steam to the under side of the fire-grate so that they will mix and enter the fire together.

768,681. AUTOMATIC BUMPER FOR USE IN COAL-MINING.—Frank Osha, Linton, Ind. An automatic bumper consisting of a curved iron shaft which is attached as herein substantially set forth together with its attachments consisting of an iron arm attached to C at *a* on the end of which iron arm is a heavy weight *i*; the other end of which arm being connected and attached to the bumper at *b* and works on the principle of a hinge.

768,722. DUMPING MECHANISM FOR METALLIC CARS.—Anton Becker, Chicago, Ill., assignor to Joseph S. Ralston, Chicago, Ill. In a car in combination with the frame of the car a pivoted door adapted to retain a part of the load, a shaft adjacent to the door, a crank-arm on said shaft, a pinion on said crank-arm in engagement with a rack on the under side of said door and means for turning said shaft, whereby as said shaft is moved, said pinion moves backward and forward on said rack and said door is opened or closed.

768,748. ROASTING-FURNACE.—Ottokar Hofmann Argentine, Kans., assignor to The United Zinc & Chemical Company, Kansas City, Mo. In a roasting-furnace, the combination of a hollow shaft provided with openings at the roasting shelves, sleeves fitting



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said openings and provided with flanges and bolts for connecting the flanges to the shaft, said bolts being provided with nuts at one end and with wings at the opposite end adapted to interlock with the shaft.

768,774. CONSTRUCTION OF FROZEN WALLS FOR SHAFTS IN MINES.—Karl Schmidt, Erkelenz, Germany. Improved means for forming frozen walls for shafts embracing a plurality of groups of connected freezing-tubes, and a freezing medium conveyed through said groups.

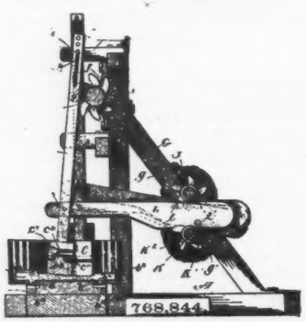
768,792. APPARATUS FOR PURIFYING GAS.—William Everitt, Ilkley, and Thomas Redman, Bolton, Bradford, England. In an apparatus for purifyng gas, a chamber having screens, and means for intermittingly directing a forced current of gas of high velocity against said screens.

768,818. CLEANSING SHEET-ZINC.—John Nelson, Peru, Ill., assignor to American Nickeloid & Manufacturing Company, Peru, Ill. A method of cleansing sheet-zinc, which consists in immersing the sheets in an alkaline bath free from compounds from which harmful acids might be formed, connecting them with the negative pole of a generator, and passing an electric current through the bath and sheets.

768,829. ASSAY-BALANCE.—Fred W. Thompson, Denver, Colo. In a balance of the class described, the combination with the balance-beam, of a hanger connected therewith and provided with a horizontal part adapted to hold riders used as weights, and a rider-carrier mounted in suitable proximity to the said horizontal part, the said carrier being provided with rider-holding pins and being revoluble and longitudinally movable.

768,841. CONVEYER.—James D. Brown, Fortescue, Mo. The combination, with a band-cutter and feeder provided with a casing, of a longitudinally-slidable conveyer provided with projections at its rear end and guide-rails at its sides, forked brackets secured to the said casing for engaging with the said projections, and rollers for the said guide-rails to slide on also supported by the said casing.

768,844. STAMP MILL.—John Cable, Chicago, Ill. A stamp-mill comprising a mortar-bed, a gravity-acting stamp, means for lifting the stamp from one side of the bed only and releasing the stamp, whereby it drops by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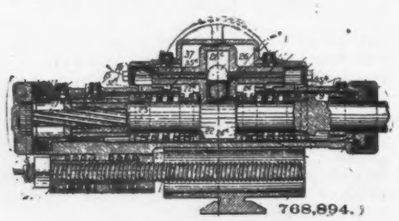
gravity upon the material on the mortar-bed, and means for shifting the stamp while bearing on such material from the side of the bed at which it drops to the opposite side of the bed and for returning it, whereby the stamp is shifted in a complete to-and-fro traverse in contact with such material between each drop and lift thereof.

768,858. CHARGING APPARATUS FOR BLAST-FURNACES.—Walter Kennedy, Allegheny, Pa. A blast-furnace plant having in combination a skipway, a skip movable along such way, a storage-bin arranged above the skipway at the skip-loading point, a line of track extending from the ore pile to a point above the storage-bin, and cars movable along such track.

768,870. COMPOSITION OF MATTER.—George H. Turnbull, Oklahoma, Okla. A liquid coating comprising pitch, oil-tar, and tallow, in combination with a coating of sand and gravel adapted to be applied to brick, cement, wood, and other surfaces.

768,886. SOLUBLE COMPOUND OF IRON AND ARSENIC AND PROCESS OF MAKING SAME.—Leopold Spiegel, Charlottenburg, Germany. A process of manufacturing soluble compounds of iron and arsenic, which consists in evaporating natural mineral waters containing iron and arsenic in the absence of free oxygen.

768,894. ROCK-DRILL.—Henry Deitz, Denver, Colo., assignor to Lewis Deitz, Albany, N. Y. In a drill, the combination of a casing having a central guideway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and a longitudinal guideway located laterally of said central guideway, a drill-holder mounted to reciprocate in said central guideway, a tool-actuating part located laterally with relation to the drill-holder and bifurcated to straddle the latter, a projection extending from the tool-actuating yoke and fitting in the lateral longitudinal guideway to be limited thereby to movement in a path parallel to that of the drill-holder, suitable bearings mounted on the drill-holder on opposite sides of the bifurcated yoke portion, and suitable means for reciprocating the yoke.

768,911. CENTRIFUGAL PUMP.—Kurt Schoene, Pittsburg, Pa. A centrifugal pump, consisting of a casing, a runner in said casing, an inlet at one side of said runner, vanes on said runner on the side opposite said inlet, and means on said casing coöperating with said vanes for preventing the passage of the water around with said runner.

768,915. DRILL-ROD CLUTCH.—Frederick B. Stoner and Calvin Hotaling, Chanute, Kan. A device comprising a rod having a socket at its lower end and slots leading downward into said socket, clutches arranged in the socket and having arms projecting upward through the slots, a ring adapted to slide on the rod and connected to the clutch-arms, a spring pressing downwardly on said ring, a second ring arranged below and in normal contact with the first-mentioned ring, a spring pressing upwardly on the second ring, and means for temporarily locking the said second ring out of contact with the ring first mentioned.

768,939. AUTOMATIC GOVERNOR FOR AIR-COMPRESSORS OR SIMILAR DEVICES.—Milan W. Hall, New York, N. Y., assignor, by mesne assignments, to Noiseless Compressor & Air Brake Company, New York, N. Y. In an automatic governor for air-compressors and similar devices, the combination of a switch, a cylinder and piston for operating said switch and connected to a source of fluid-pressure, a tubular extension of said cylinder, a piston traveling in said extension, a head on said extension having a port, the rod of said piston having a groove therein registering with the port and terminating short of the piston whereby an air-cushion is formed in said extension near the end of the stroke.

768,955. PULVERIZER.—William M. Russell, New York, N. Y., assignor, by direct and mesne assignments, to Tomas Asencio, William M. Ernst, B. F. Montanye, and The Phoenix Investment Company, New York, N. Y., and Theodore P. Bourne, Montclair, N. J. In a pulverizer and blower the combination of an imperforate casing having an inlet above and an outlet below, a shaft vertically journaled in said casing, and bats or beaters carried by said shaft and arranged in series one above the other, the bats or beaters being inclined at an oblique angle to the horizontal, the bats of one series being inclined less from the horizontal than those of the series next below, and so on down through the several series, whereby the bats or beaters act during their rotation to resist the passage of material by gravity downward through the casing while pulverizing the fuel, mixing it with air and expelling the mixture from the casing.

768,972. COMBINED CRUCIBLE AND PREHEATER.—James A. Aupperle, Indianapolis, Ind. The combination of a crucible provided with an air-induct and an air-educt, a preheater connected with said air-induct, and means for heating both said crucible and said preheater.

768,995. ELECTRIC-ARC FURNACE.—Antoine H. Imbert, Grand-Montrouge, France, assignor to Société de Metallurgie Electro-Thermique, Paris, France. In an electric furnace, the combination with a sole or hearth, a ceiling and vertical side walls forming a chamber of symmetrical, oppositely-inclined charging-channels connected to the chamber at its ends, and a pair of horizontal electrodes for each channel penetrating into the furnace through the side walls of the chamber and adjacent to the channel-openings.

An electric-arc furnace comprising a chamber having a sole or hearth, and a ceiling formed of an inside wall of graphitic carbon and an outside wall of refractory material, said inside and outside walls inclosing between them a space cut off from the exterior, substantially as described,

769,052. APPARATUS OR FURNACE FOR HARDENING STEEL CUTTERS OR OTHER TOOLS.—Shipley N. Brayshaw, Manchester, England. Apparatus for hardening steel cutters and other tools comprising in its construction an annular casing with inwardly-projecting sides, a melt-pot therein wholly inclosed by the casing to contain a fusible mixture, a perforated tray inside the furnace to hold the tools and lower them into the pot, a pedestal of fire-brick upon which the pot rests and against which the flame impinges and a ring of burners placed round the bottom of the furnace.

769,078. PROCESS OF MANUFACTURING IMITATION STONE PLATES, SLABS, OR TILES.—Ludwig Hatschek, Vöcklabruck, Austria-Hungary. A process of producing artificial stone plates, consisting of first mixing fibrous material and hydraulic cement in the presence of a great bulk of walter, then forming therefrom a series of thin layers of the mixed cement and fibrous material superposed on each other until the required thickness is secured, then pressing the same and allowing the material to set or harden.

769,080. TOOL FOR MAKING DEEP WELLS.—Charles M. Heeter, Butler, Pa. A drilling-tool for deep wells having sides recessed to afford shoulders for engagement with a fishing-tool.

769,087. PROCESS OF MANUFACTURING OR PRODUCING ASBESTOS MILLBOARDS, SLATES, PLATES, OR TILES.—Thomas H. Ibotson, East Greenwich, and Robert Meldrum, Blackheath, England. A process of making a pulp-board product consisting in pulping asbestos fiber with magnesium oxide and subsequently treating the pulp to an alkaline-silicate solution.

769,105. EXCAVATING-MACHINE.—Albert McCarthy, New Orleans, La., assignor of nine-sixteenths to Hubert M. Ansley, W. H. Fitzpatrick, and Marina Ruello, New Orleans, La. In an excavating-machine, the combination with a suitable movable support, of an endless flexible means rotatably carried by said movable support, transverse plates carried by said flexible means, a plurality of picks affixed to said transverse plates, a plurality of movable scoops located in the rear of said picks and carried by said movable support, and means for conjointly operating said flexible means and scoops and feeding said movable support forward during said operation.

769,106. MUD-GUN FOR FILLING IRON-NOTCHES OF BLAST-FURNACES.—Felix McCarthy, Pottstown, Pa. In a mud-gun of the character specified, a mud or clay chamber having a discharging-orifice; a piston adapted to discharge the mud therefrom and a steam-cylinder having a piston-rod connected to said mud-piston and adapted to actuate the same, in combination with a mud-valve of suitable character located intermediate the mud-receptacle and discharging-nozzle thereof.

769,121. WELDING-MACHINE.—George B. Walker, Lemoyne, Pa., assignor of three-fourths to Jacob E. Hertzler, Mechanicsburg, Pa., Robert L. Myers, Camphill, Pa., and William J. Lescure, Harrisburg, Pa. In a welding-machine, the combination of an anvil with a die for holding and shaping the interior surface of the welded end of a link, means for locking the die to said anvil, an arm pivoted to the anvil, a tool-support pivoted to the upper end of said arm, a reciprocable tool carried by said support, and a reciprocable die carried by said tool provided with a lower inclined surface having a cavity in the forward portion of its face and constructed and designed to contact the upper face of the stationary die in its downward movement and to then slide or glance toward the forward portion of the stationary die to weld the link and form the exterior surface of the welded end of the link.

769,123. ASPHALT PAVING-CEMENT.—Frederick J. Warren, Newton, Mass. A paving mixture having a cement for permanently uniting and binding together the mineral or wearing ingredients, and adapted for that purpose without material change in its composition or physical condition prior to the completion of the laying of the pavement, which consists of a plastic asphaltum provided with heavy permanent oils, in combination with a light temporary oil.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy.

Week Ending August 13, 1904.

15,434 of 1903. EXTINGUISHER FOR MINERS. LAMPS.—W. Davies and R. Beale, Rhondda. An automatic extinguisher for miners' lamps; to act directly the lamp is opened.

19,506 of 1903. MINE-CAR COUPLING.—J. A. Noel, Cardiff. Improved construction of shackle pin for colliery tubs, to prevent its accidental displacement.

19,889 of 1903. STAMP-MILL.—F. M. Castleman, Johannesburg, Transvaal. Improved method of securing tappets to the stems of stamps.

22,095 of 1903. LEACHING VAT FILLER.—H. W. Blaisdell, Los Angeles, California, U. S. A. Improved apparatus for distributing fine ores into leaching vats.

SPECIAL CORRESPONDENCE

San Francisco. Aug. 31.

(From Our Special Correspondent.)

A meeting is being held in San Francisco to promote a new organization of the mine operators of the State. The mine owners have had so much trouble during the past year with labor that they feel the necessity of getting together for mutual protection.

The suit began about four years ago by W. H. Dailey, acting for the Gold Run Gravels, Ltd., against Joseph D. Redding, J. E. Doolittle and E. A. Wiltsee has been dismissed on defendants' plea that nothing has been done in the case for two years by the plaintiff corporation, which has gone into liquidation and ceased work. The suit was to recover $90,000, alleged to have been made in a deal.

The White Swan Mines Co. has begun an action for an accounting against Letson Balliet, its former manager, and charges that Balliet received $283,013 for stock sold; he claims that he expended this for the corporation's benefit. But disbursements amounting to $183,937, entered on the books, the company claims were made without authority. Some of these disbursements, as itemized, look "queer" as disbursements for a mining company, such as: Refunded to purchasers of stock, $5,350; rent of Balliet's house, $1,155; fees and expenses of Balliet's defense when indicted in Iowa for using United States mails with intent to defraud, $21,669; promotion of Hudson Mutual Gold Mining Co., $1,327; purchase of Baker City (Ore.) *Herald* and publication of that paper, $37,576; special edition of that paper, $766; operation of Rapid Addressing Co., $1,996; bail given in Iowa, $1,000; to indemnity surety on Balliet's bail bond, $2,500; promotion of Longfellow Consolidated Mining Co., $370. It is estimated his household and living expenses were about $10,000, and office and other expenses, $50,000. The company alleges that Balliet is withholding large sums of money. The case will be watched with interest by people all over the country who "invested" their money on the statements of the prospectuses, circulars, etc., issued by Balliet. The mine in Oregon is now being run by new directors, and Balliet has no voice in the management.

The Great Western Gold Mining Co., which is erecting a smelter in Shasta county, has brought suit against the Polkinhorn Mining Co. to quiet title to the Afterthought group of nine copper claims, in which the latter company claims an adverse interest. Several persons have failed to handle the ore at a profit, as it contains antimony, zinc, arsenic and other unpleasant substances. However, the Great Western Co. says it can work the ores at a profit, and considerable money is being invested in development and plant.

The affairs of the Colorado Hydraulic Mining Co., owning mining ground near Needles, San Bernardino county, are still in a mixed condition. There are allegations of fraud in management, with injunction suits and fights among the directors. W. H. Orr has been deposed as president for S. P. Blumenberg. An assessment has been levied on the stock.

In the Oroville, Butte county, gold dredging field five new dredgers are under construction and 27 are already at work. The Viora company is having two built for the ground recently bought from J. M. McGee. The Lava Beds Dredging Co. is building a new one, as is the Boston & California Dredging Co. and the Oroville Dredging Co. has another under way. It is also reported that both the Feather River Exploration Co. and El Oro Dredging Co. will soon have a new dredge each. The New York & California Dredging Co., recently organized, has bought the plant of the Marogold Dredging Co. at Oroville. The dredging fever has got into Nevada now, and a company is drilling near Dayton on ground supposed to be favorable.

In view of the fact that the Mountain Copper Co., at Keswick, Shasta county, is buying large quantities of quartz for flux, and has ordered what it can get, after a cessation of buying for some time, the people of the smelter town are getting over their scare of the entire smelting works being removed to Bull's Head Point, near Martinez, on the San Francisco bay shore. The company is urging miners to open small claims in the Keswick region, so that more flux may be obtained. Eleven McDougall roasting furnaces are being pulled down at Keswick, as only a few will be kept. The old stack has been torn down and the machinery has been stored. The plant at Keswick is, however, being worked to as full capacity as possible under the present scarcity of flux and labor. It is stated that the report of the company fixing an age limit at 50 years for employes is incorrect.

The Pacific Portland Cement Co., with works near Suisun, in Solano county, is rapidly increasing its plant. It started two years ago with a capacity of 600 bbl. a day; increased this to 1,600 bbl., and is now at work putting up buildings and machinery to turn out 3,200 bbl. per day, giving employment to about 400 men. Cottages for workmen are being put up at the town of Cement, near the works.

While the sentiment of the oil producers of Kern county is very decidedly against selling any quantity of oil below 15c. per bbl., the Associated Oil Companies say they cannot afford to pay more than 12½c., and the Standard Oil Co. says practically the same. Some of the oil producers of the San Joaquin Valley have hopes of getting their oil to the ocean side through the Pacific Oil Transportation Co., and think that once at the sea they can sell it independently of the Standard. The Petroleum Miners' Association is out with a circular saying that the Kern River field is now producing 40,000 bbl. a day; McKittrick, in the same county, 10,000 bbl., and Coalinga (in Fresno county), 16,000 bbl., or a total of 66,000 bbl. daily. This, with the output of the southern districts, would make about 30,000,000 bbl, a year at present rate of output. The Standard Oil Co. has about 10,000,000 bbl. in storage in Kern river, and has contracts to take 15,000 bbl. a day at 15c. The Associated Oil Companies have in San Francisco oil stored to meet contracts for three months, and their own wells supply all needed above that on hand; so independent companies must sell as best they may. The present consumption is not quite two-thirds of the production. It is not at all probable that any new wells will be drilled in any of the fields under present conditions. The Standard has stopped buying Kern oil for the present.

Jackson, Sutter Creek and adjoining mining sections in Amador county are to have direct railroad communication with the main line at Ione. The electric line from Ione to Jackson, Sutter Creek and Amador City is supposed to be owned by the Ione & Eastern railroad, but many think that the Southern Pacific is interested. The gauge is to be the same as the steam road at Ione. The principal mines are from 10 to 20 miles from Ione, and heretofore all hauling has been done by team, entailing considerable expense, especially in the winter. Jackson is 12 miles from Ione, Sutter Creek 3 miles west of Jackson and Amador City 3 miles further on. At each of these places are a number of mines, such as the Kennedy, Oneida, Zeile, Wildman-Mahoney, Keystone, etc., which will be greatly benefited. The electricity is to be supplied by the plant of the Standard Electric Co. of Jackson, where $2,000,000 is soon to be spent in improvements.

Another road of importance is that to be built from Yreka to Scott Valley, Siskiyou county, terminating at Etna. The distance is 42 miles, and a contract has been let for the road-bed, trestles, etc. A very rich mining section will be opened, but the road will hardly be completed before snows fall. The first contract is to be done in 30 days. Joseph Johnson is the promoter.

Some San Francisco men who are going to mine 400 acres of dredging land three miles from Jenny Lind, 200 ft. above the Calaveras river, Calaveras county, intend to build a big dam across a deep gulch, pump water into the gulch and thus form a small lake, on which they will float a dredger.

Some heavy washouts up in the Tonopah and Goldfields region of Nevada are reported. Mail communication and all teaming has been stopped. Repairs are being made as rapidly as possible.

Denver. Sept. 3.

(From Our Special Correspondent.)

The trouble in the Cripple Creek district continue one of the main subjects of conversation among mining men. The most bitter feeling continues to exist there against union sympathizers, and it looks as if troops may be needed again before permanent quiet is established. Frank J. Hangs, the local attorney for the Western Federation of Miners, who was deported a couple of weeks ago, returned to the district this week, and but for the personal protection of Sheriff Bell might have been severely dealt with. He expects to assist Attorney Hawkins in defending the parties charged with complicity in the riots at Victor, whose trial is docketed for September 20. The sheriff's forces have prevented several deportations, and are kept very busy trying to stop further lawlessness. Mr. Engley, who was among those deported recently, has returned and is being protected by the sheriff. On August 30 several shots were fired at Sheriff Bell and four of his deputies from the residence of Rev. T. S. Leland; no one was hit; a number of guns were found in the house. Arthur Parker and L. R. Jenks, two union men recently released on bonds, were arrested, as was also Rev. T. S. Leland, who was at church when the disturbance occurred. They were charged with assault with intent to murder, assault with a deadly weapon and conspiracy, and bonds were fixed at $2,500. Andrew Le Duc, who was deported in June, returned to his home recently, when a number of men took him to the road to Canyon City and told him that he would be hung if he returned. George M. Hooten, formerly assistant manager of the union store at Anaconda, has been deported by a mob. A complaint has been filed in the United States Court by the Interstate Mercantile Co., of Montana, against the Citizens' Alliance, of Cripple Creek, and the Mine Owners' Association, to be followed by a suit for damages. Deputy United States Marshal Frank served notice on almost all the parties mentioned in the complaint, which alleges that the above two organizations have assumed the powers of city and county government. In the District Court of Teller county, H. M. Robertson has filed suit asking that he be restored to the position as sheriff, claiming that his resignation was not voluntary.

Sheriff Bell, in reply to a letter from Governor Peabody offering troops, stated that he felt competent to handle the situation, and threw the blame of the recent disturbances on the Western Federation, which he claimed wished to create an impression of alarm and bring disrepute on the administration of his office. He is certainly trying to do the best he can under trying circumstances.

About 4,000 men, all with cards from the Mine Owners' Association, and not owning allegiance to the Western Federation, were employed in the district, which during August produced about $1,800,000. Taking into consideration that two large producers were idle during a large part of the month, this is an excellent showing. The combined payrolls aggregate nearly $500,000, and when peace is reestablished in the district, an era of prosperity will undoubtedly begin.

The decision of the American Mining Congress to make Denver its permanent headquarters was received here with pleasure. The election of Mr. William Lennox, of Colorado Springs, as a director for the coming year, is favorably commented upon.

The Denver, North Western & Pacific railroad, of which D. H. Moffatt, treasurer of the Congress, is the moving spirit, has now nearly reached the summit of the Continental divide. From Hot Sulphur Springs in Grand county the road will run to Kremmling and Steamboat Springs, whence it will follow down Bear river, through Hayden and Craig counties. It will reach Utah near the point where the Yampah river, a continuation of the Bear river, joins the Green river. This road will open up a great territory, with rich mineral resources.

It is understood that on October 4 the sale of the Denver & Southwestern railroad, which has defaulted the payment of interest on its bonds, will take place in New York. This company owns the La Belle power plant, the Florence & Cripple Creek railroad, and a large amount of other property.

Mr. George E. Roberts, director of the United States mint, was in the city this week to attend the formal opening of the new mint here. The offices and assaying department are complete, and it is expected that the next session of Congress will make the necessary appropriation, so that the coinage can commence when that part of the plant is complete. E. E. Burlingame & Co., of this city, the old firm of assayers, made the first deposit of bullion.

Bisbee. Sept. 1.

(From Our Special Correspondent.)

After several changes of opinion it has been determined to enlarge Cole shaft of Lake Superior & Pittsburg mine to a 4-compartment, 8 by 24 ft. outside timbers. It is now 6 by 6 ft. The work will require several months. When completed, the mine will be able to stope the large ore body developed between the 900 and 1,100-ft. levels south of this shaft. It looks as though No. 2 shaft were sunk beyond the mineralized formation, and will get no ore except at its upper levels. Surface showings about this shaft are as good as anywhere in the district.

When Briggs shaft of Calumet & Pittsburg was enlarged from two to five compartments, the work being done in 9 weeks and 3 days, it was enlarged 18 ft. on the west side, 2 ft. on the east, 2 in. on the north, and 10 in. on the south, to a depth of 910 ft., and is now 29 ft. 10 in. by 7 ft. This is believed to be record-breaking work. The pair of Prescott pot-form pumps in this shaft are working, and it is expected that progress will be about 40 ft. per month. At 1,100 ft. a station will be cut and drifts started for the ore known to exist at that level.

There has been an advance of $13 a share in stock of Junction Development Co. in the past two weeks, on account of a report that ore has been cut by a drill. The only drill working in this prospect is in the bottom of the shaft, where water came in so fast three weeks ago that sinking could not be continued. This drill may have cut ore, but if it has, no one aside from the company's management is in position to know anything definite about it. There is still $9 to be called on Junction shares, only $6 having been paid in so far.

Calumet & Arizona has declared its fourth regular quarterly dividend of $300,000, which, with $100,000 extra paid last December, makes $1,300,000 in the first year. The company has a surplus, cash, copper and supplies, of above $1,600,000.

Salt Lake City. Sept. 2.

(From Our Special Correspondent.)

The miners' union at Park City, which has undertaken the building of a hospital, is endeavoring to get the operators of the camp to support the institution. At present the fees exacted from employees each month are divided among the Salt Lake hospitals. The operators have not decided what they will do, but it seems probable that the patronage will be divided.

At a meeting of the stockholders of the New York Tonopah Mining Co. in this city to-day the sale of the property at Tonopah was ratified. The reorganized company—the New York Tonopah Consolidated Mining Co.—assumes the indebtedness of the old one and agrees to carry on development.

During August the independent copper smelters produced about 2,000 tons of copper bullion, and the output is steadily on the increase. The Utah Consolidated sent out 1,689,905 lbs.; the Bingham Consolidated, 1,180,484 lbs., and the United States, 1,226,330 lbs. It is claimed that the value of the products of the respective plants is 20, 25 and 30c. per pound.

The Uncle Sam Consolidated Mining Co. sent to the Salt Lake markets during August 16 car loads of concentrates, netting approximately $800 per car load.

Toronto. Sept. 1.

(From Our Special Correspondent.)

The Canadian government, by an order in council, has imposed a duty of $7 per ton upon steel rails and bars, in pursuance of the act of 1903 providing for the imposition of the duty whenever satisfactory evidence was furnished that rails of the best quality were being made in Canada in sufficient quantity to supply the ordinary demand. The duty is subject to the reduction of 33 1/3% provided for by the British preferential tariff, and also to the 'anti-dumping' law, under which, in cases where the selling price of imported goods is less than the fair market value in the country of export, a special duty is added equal to the difference. Rails actually contracted for before the date of the order are exempted, but must be imported not later than November 30, and be laid on the track not later than February 28, 1905.

At a meeting of the directors of the Cramp Steel Co., Ltd., of Callingwood, Ont., on August 26, Major J. A. Currie was elected president and Major Duncan Donald, secretary. This is a step in the reorganization project which Mr. Meldrum, of New York, an ex-director, attempted to block by an interim injunction. The directors will proceed to transfer the quarry lands of the company and the bonds of $60,000 granted by the town of Collingwood to the reorganized company, which will be known as the Northern Iron & Steel Co., Ltd.

The Ontario Bureau of Mines has received a report from W. G. Miller, Provincial geologist, stating that the tour of the joint committee of geologists representing Canada and the United States, to arrange for a common classification and nomenclature of the rock formation, has been successful, an agreement on many points of difference having been reached. The committee visited Loon Lake, where important discoveries of iron ore have been made recently, and after carefully studying the relations in the rocks of that area named it the Animiki iron range. The United States authorities have placed a party of eight men mapping the range, under the direction of Prof. Van Hise, and another party preparing a geological map of the iron range north of Biscotasing on the Canadian Pacific railway.

The Nova Scotia Steel & Coal Co. blew in its first blast furnace at Sydney mines, N. S., on August 30. The furnace has a capacity of from 200 to 250 tons per day. The company has now about 100 coke ovens in operation, and expects to have 150 more going in a few weeks. It has imported from its Wabana mines large quantities of ore, and opened new dolomite quarries near the works. R. H. Brown, consulting engineer of the company, is examining the company's coal areas at Point Aconie.

Mr. Alex. K. Kirkpatrick has been appointed professor of civil engineering in the school of mining connected with Queens University, Kingston, Ont.

Victoria. Aug. 30.

(From Our Special Correspondent.)

Slocan.—It is reported that an amalgamation of the Whitewater and Whitewater Deep properties is under consideration. Mr. Barclay Bonthrone, representing the Erl Syndicate, Ltd., a British company, recently visited these mines. Ore containing native silver and free gold is reported on the Jo Jo claim, on the North Fork of Carpenter creek. Similar ore has also been repeated on the McAllister claim, the vein on which is believed to be an extension of the Jo. Jo. A contract has been let for a raise to connect two levels in the Capella mine, near New Denver. This property holds the record in the Slocan for a shipment of high-grade ore, 40,600 lb., sent out some time since, having returned about 900 oz. silver per ton, netting $10,101.

Lardeau.—The Elwood Tinworkers Gold Mining Co., owning the Silver Dollar, near Camborne, in the Fish River section, has decided to install a compressor plant. Progress is being made on the Mammoth group, near Camborne. A 4 ft. lead of galena has been found on the Sirdar claim, while on the Crescent, another of the group, 30 tons of ore have been sacked for shipment; 15 men are making a trail to this group. The men employed on the Eva and Oyster-Criterion groups have had to live in tents since the burning of the mine buildings, but work on new bunk and boarding houses is to start shortly. A second shipment of silver bullion of 21,600 oz. has been made from the combination silver mill of the Silver Cup Mines, Ltd., at Ferguson, to the refinery at the Trail smelter. Owing to shortness of water there has only been sufficient power available for 10 stamps, but rain has lately fallen, and 20 are now dropping.

Vancouver Island.—Mr. Thos. Russell, retiring superintendent of the Western Fuel Company's collieries near Nanaimo, was presented with a valuable clock by the company's employees and his Nanaimo friends. At the banquet, Mr. Thos. R. Stockett, general manager, said that in September the new pithead (to replace that lately destroyed by fire) will be so far completed that the hoisting of coal can be resumed. When the new machinery, now on the ground, shall be in place at No. 4, the pithead there will be unique, as it will be possible to load coal direct from the mine to the ship without handling. Mr. Russell, superintendent of the company's collieries, said that Departure Bay mine is now developing rapidly, and will shortly be in a position to employ a large number of men. In No. 1 shaft an extensive field is being opened, equal in area to the entire workings of the colliery for the past 50 years.

Yukon.—The gold shipments from Dawson during July aggregated $1,300,250, according to the records kept by the territorial comptroller. The year's gold shipments from Dawson to August 1 were valued at $5,181,735.

Ymir.—Advices from Ymir, in the Nelson district, state that ore milled in local mills and shipped from Ymir mines to the smelters now exceeds 10,000 tons per month, a considerable improvement. With the exception of the Ymir Co.'s gold mine, which now produces less than half of the total tonnage, the mines in the district are as yet only in their infancy. The new strike of ore in No. 3 tunnel of the Wilcox mine has proved continuous for over 150 ft., and is from 2 to 3.5 ft. wide. The depth from the surface is about 200 ft. The Erie Placer Mining Co. is preparing to start operations on its placer ground, on the north fork of Salmon river. The gravel carries good values and the gold is coarse and easily recovered.

Monterey. Aug. 31.

(From Our Special Correspondent.)

The most interesting development of the week has been the endeavor to revive and reorganize the many practically defunct mining companies of El Oro district, Mexico, the stocks of which were so largely sold in the City of Mexico. W. E. Paige is trying to reorganize the Chihuahua Mining Co. as the Chihuahua Mining Co. of El Oro, with a capital of $300,000 gold, par value, of which 12 will be given for each share of the old company, 3,000 shares, par value $25 Mexican each, leaving the 264,000 shares to sell for development purposes. The endeavor at first will be to raise $50,000, gold, with which to start work, and Mr. Paige believes he will be able to resume operations early in November.

In Oaxaca considerable interest has been shown in the large deposits of onyx, near Jalapa, in the district of Tehuantepec, and a French company is negotiating for the greater part of the output. Near the Natividad mines in Oaxaca, the Mexican Mining & Milling Co. is preparing to erect a 100-ton mill.

In Chihuahua, William and Thomas Dale and Felix McDonald, the present owners of the Americano mine of Terrazas, have organized the American Mining & Smelting Co., under the laws of Chihuahua. Paul Ginther, brother of Henry Ginther, who is developing the Hercules iron mines, is said to have raised $200,000, gold, in Europe, for resuming operations and erecting a 100-ton smelter at the Encinillas Mines, Ltd., at Santa Rosalia, which will be under his management. About 85 miles northwest of Parral and 50 miles southwest of Batopilas, a free milling vein of $10 gold ore, said to be 65 ft. wide, is reported in La Doris mine of J. F. Bode; he has put in a 100-ton Huntington mill and has 85 men working under the superintendence of D. E. Owen. A little 10-ton smelter put in by La Gloria people at Cusihuiriachic is running. The Calera Zinc Mining Co., of Minaca, has shipped three carloads of its ore to Colorado and other points for experiment to determine the best plant for handling it. Mr. Walter M. Brodie, of El Cubo Mining & Milling Co., Guanajuato, has been asked to make a report supplemental to that of J. W. Malcolmson, on the smelter project of Enrique C. Creel, and others, of Chihuahua.

The Metallurgical Co., of Torreon, owners of the San Diego mine, of Santa Barbara, on which was recently made a rich strike of silver-lead-zinc ore, has approved the plans of J. W. Pender for a 200-ton concentrator embodying the Wetherel magnetic separator, and the zinc concentrates will go to Antwerp, while the lead product will be treated at the Torreon smelter.

London. Aug. 27.

(From Our Special Correspondent.)

The half-yearly report of the Dolcoath mine shows that work was somewhat interrupted by floods due to the heavy rainfall, but the total number of tons mined remained about the same as in previous half-years. The ore crushed was 50,196 tons, and it yielded 810.75 tons of black tin, being a produce of 36 lb. per ton of ore. The average price obtained for the black tin was £74 12s. 6d., and the total amount realized was £60,500. The average content was lower by 2 lb. than in any previous period, and compares with 79 lb. in 1895, when the mine was taken over by the present limited company. The working costs during the half year were £50,182; £2,951 was paid as royalty to the ground landlord and £1,100 went as directors' fees and in payment of income tax, so that the net profit was just under £7,000. Out of this, and out of the balance brought forward from last year, it is proposed to pay for the development work and to write off amounts for depreciation of plant. The company now has practically no reserve of capital, but has a balance in hand of £5,594. It is not at all likely that any further capital will be issued at present, and everything will have to be paid for out of earnings. The report does not give any precise information about the prospects of the mine for the future. It is a case where it is impossible to estimate ore reserves. At the present time the mine brings wealth locally to the landlord and the employees, and for that reason alone it will continue to be one of the institutions of the country. The shareholders do not get anything, nor is there any immediate likelihood of their doing so. Many of them, however, are recouped in indirect ways by the working of the company, so there are no loud grumblings at the absence of dividends.

The other well-known tin mine in Cornwall, the Carnbrea Tincroft, has also issued its report for the first half of 1904, and it is a much more encouraging one than ever before. Readers of the JOURNAL will remember that six months ago I recorded the discovery of profitable ore at one part of the mine. This ore has had an important effect on the finances of the company, for whereas there had been continual losses in previous years, the months of May and June of this year have shown a substantial profit. This improvement came too late to have any marked effect on the finances of the half-year, but, no doubt, during the current half-year the results obtained will be very satisfactory. The average yield of black tin during the last few years has been about 26 lb. per ton, a very low figure, while the newly discovered portion has averaged 51 lb. per ton. The developments continue to show that this ore-body is extensive, and everybody connected with the mine is in high good humor. During the first six months of the year 24,745 tons of ore were mined, yielding 320 tons of black tin, and the sales realized £22,083. It is also to be noted that small amounts of copper ore, arsenical ore and wolfram are recovered, but the proceeds amounted to a comparatively small sum, £2,000. After providing for all expenditure there was a loss on the half year's work of £3,660. Just before the discovery of the new lode was made the finances of the company were in a precarious condition. The capital was exhausted, and operations were carried on at a loss. It was found necessary for the director and their friends to guarantee personally an over-draft at the bank, in order to prevent a crisis. As it happens, this guarantee has not yet been acted on, as the improved situation at the mine has been accepted by the bank as sufficient security.

Sydney. July 26.

(From Our Special Correspondent.)

The comparative statement of gold yield of Australia and of New Zealand during the first six months of 1903 and 1904 is as follows, in fine ounces:

	1903. oz. fine.	1904. oz. fine.	Changes oz. fine.
Western Australia	1,035,452	984,713 D.	50,739
Victoria	355,125	368,884 I.	13,759
Queensland	320,500	310,201 D.	10,299
New Zealand	230,198	241,089 I.	10,891
New South Wales	103,918	141,682 I.	37,764
Tasmania	28,093	*28,250 I.	157
Total	2,073,286	2,074,819 I.	1,533

*Tasmania 1904 yield estimated. Returns for South Australia are not available but would not exceed 2,300 oz

These returns indicate that gold mining in the eastern states of Australia is in a healthy condition. In Queensland, though the depression affecting Charters Towers has not wholly lifted, there are signs of returning confidence, justified by the fact that the dividends from this field for the six months amounted to £204,913, or an excess over calls of £154,560. At the request of the shareholders, Mr. F. Danvers Power has just furnished a report on the Glanmire and Monkland mine, Gympic, in which he condemns the way the mine has been laid out and equipped. In Victoria the Bendigo field continues to furnish proof of the richness and permanence of its mines. The United Ulster Co. treated 4,000 loads during the past half year for a return of 8,645 oz.; the total cash realized was £35,869, of which £28,000 was distributed in dividends, making the total dividends £128,000, or £4 a share. At the Victoria mine a depth of 4,000 ft. has been reached by a winze from the 3,700-ft. crosscut. The deepest shaft on the field is that of the New Chum Railway Co., 3,900 ft. The Long Tunnel Extended Co. won gold to the value of £37,204 during the half-year, making the total value of the gold obtained £1,270,703, of which amount £642,240 have been paid in dividends. The satisfactory yields secured from the deep alluvial leads at Chiltern and Rutherglen have stimulated operations. The Chiltern Valley Co. has declared a dividend of 2s. a share, making the total dividends £198,155.

Operations at the Broken Hill silver-lead mines continue exceptionally active. The Proprietary mine during the last four-week period mined and raised 51,600 tons of ore. The output from January 1 to July 13, 1904, was 2,891,336 oz. silver and 36,804 tons lead of a total value of over £500,000. The permanent Delprat salt-cake plant, capable of treating 2,000 tons of tailings weekly, is started. A dividend of 1s. a share, or £48,000, has been declared. The South Company has also declared a 1s. dividend. The Block 10 Co. is installing a small Odling magnetic separator to get a marketable zinc concentrate.

Following the decision of the Broken Hill Proprietary Co. to begin making sulphuric acid, the directors of the Mt. Lyell Co. (T) intimate they intend to erect works and manufacture superphosphates. The face of the drive at the 600-ft. level in the North Lyell mine is reported better than the upper level and will, it is estimated, average 10% copper. Contrary to intentions the New Chillagoe Railway & Mines Co. (Q) did not stop work at the end of June, finding several bodies of good ore on different holdings, which it is hoped will enable work to pay for some time longer. Some 40 tons from one of the lodes averaged 18% copper, 16% lead, and 34 oz. silver per ton. The ore now being raised from the Lloyd copper mine, Burraga (N. S. W.), is of so low grade that the directors in England are considering closing down. Some 1,500 men are employed, the mine being the mainstay of the district, and the employees have been asked to accept a considerable reduction in wages. The Crowl Creek mine, Shuttleton (N. S. W.), is developing well, the output during the past week being 25 tons of copper.

Owing to the presence of cement and a considerable quantity of overburden, the output of stream-tin from the Briseis mine (T), during June, fell to 31 tons. The Stannary Hills mine (Q) treated 7,649 tons of ore during the past half-year for a return of 279 tons of concentrates averaging 71.2 per cent metallic tin. Steady progress is being made at the recently-discovered tin-field at Port Darwin, and the miners are doing well, but the bad water supply is telling on their health. The New Wylie Creek dredge (N. S. W.) obtained 1 ton 4 cwt. tin ore last week, and the Inverell dredge 2 tons.

Auckland. Aug. 5.

(From Our Special Correspondent.)

Gold and Silver Export.—During July, New Zealand exported 48013 oz. (crude) of gold, valued at £180,277 ($901,385), and 150,680 oz. silver, valued at £16,440 ($82,200). The total gold export for the seven months of this year was 315,318 oz., valued at £1,204,359 ($6,021,795). This is a small increase over the corresponding period of 1903.

Gold Dredging.—The South Island dredges have hardly done as well during the past few months as was expected, and the small returns have greatly disheartened many shareholders. This is mainly because Molyneux river, on which nearly all the rich claims are situated, has been for many months at a high level. During the past two or three weeks the returns have improved, but the winter is now almost ended, and as heavy falls of snow have been reported, prospects for the next few months are not very bright. At the same time, the gold won this year up to the time of writing exceeds that obtained during the corresponding period of 1903 by several thousand ounces. It is evident that the river companies have erred in reckoning on a low river, every winter, whereas it is only once in every four or five years that really favorable dredging conditions may be expected for any length of time.

Hauraki Gold field.—Though the Waihi mine keeps up its production, the field as a whole is not advancing. The chief returns during the past few weeks were as follows: Waihi, £52,266 ($261,330) from 19,798 tons; Talisman, £6,887 ($34,435) from 3,975 tons; New Zealand Crown, £3,313 ($16,565) from 2,414 tons; Komata Reefs, £2,237 ($11,185) from 1,260 tons; Royal Oak, £1,501 ($7,505) from picked stone; Tairua Broken Hills, £1,040 ($5,200) from 500 tons.

The only noteworthy development on the field during the past few weeks has been the intersection of a large lode in the Waihi Extended claim, which adjoins the Waihi and Waihi Grand Junction mines at Waihi. This ore body was cut at the 500-ft. level near the Grand Junction boundary. The discovery is of great importance, indicating the eastern extension of the wonderful lode system of the Waihi underneath younger volcanic rocks. The reef is fully 16 ft. thick, but assays are disappointing, varying from 2 or 3s. up to £1 3s. 7d. per ton. It is believed that the lode will improve with depth, for it was intersected just below the probable ancient outcrop now buried beneath lava flows, thus resembling, I believe, some of the lodes at Tonopah, Nev. It is assumed that the lode where intersected has been impoverished by leaching, which probably carried the values lower. It must be left to Father Time to prove the correctness of these views. The prospects of the Waihi Extended are, however, certainly encouraging.

State Coal Mines.—The State coal mines are now supplying fuel to the Government railways in the Wellington and other districts. The surplus product is sold to private consumers, or rather to Wellington coal merchants, who are said to be retailing it at ordinary prices, so that the cost of household coal at Wellington has not been reduced, as was claimed would be the case when the State mines were started.

Perth. July 25.

(From Our Special Correspondent.)

The commission appointed to inquire into the recent apparent over-valuation of the ore in the Boulder Deep Levels mine has been taking a lot of evidence. Mr. R. Hamilton has assisted in re-sampling the lode at the 900-ft. level, and over 50 assays show an average of 17 dwt. of gold per ton for a length of about 300 ft. This is satisfactory, but certainly very different from the assays on which the shares recently boomed.

At Coolgardie, mining is becoming a settled industry. The economical conditions existing and the plentiful supply of water makes large ore bodies of 4 to 6 dwt. per ton payable, whereas in the earlier days such mines were regarded as worthless. Immense quantities of such ore exists here, and in many parts of these fields.

On the more northern fields, many promising finds are reported. The rich stone found in the center of the Leonora township looks well. The East Lynne has again been getting some rich ore.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. J. W. Abbott is now at Bellingham, in Washington.

Mr. A. C. Beatty is taking a holiday in Cornwall, England.

Mr. Henry Bratnober has returned from a trip to Alaska.

Mr. Charles Homer is examining copper claims in Nevada.

Mr. Louis Dunham has returned to New York from London.

Mr. Bernard Macdonald, of Spokane, is now at Guanajuato, Mexico.

Mr. G. R. Jones has returned to Bethesda, Wales, from West Africa.

Mr. L. H. Jansen, of Kansas City, starts shortly for Sonora, Mexico.

Dr. Rudolph von Erggelet, of Vienna, Austria, was in Denver last week.

Mr. Albert M. Austin, of Llano, in Sonora, Mexico, is visiting New York.

Mr. Henry C. Frick returned from Europe on the *Kaiser Wilhelm* August 30.

Mr. J. H. Hise has returned to Prescott, Ariz., after a visit to Atlanta, Georgia.

Mr. A. H. Strong, of Brooklyn, has returned from a mining inspection in Canada.

Mr. Robert C. Kirk has returned to Oakland, Cal., from San Dimas, Durango, Mexico.

Mr. P. H. Donohue has been examining mining properties in California and Nevada.

Mr. E. Lenox Simpson, on his return from Russia, is now on his way to South Africa.

Mr. F. D. Johnson has resigned as manager of the Ivanhoe Junction mine at Kalgoorlie.

Mr. H. W. Turner, of San Francisco, is examining quicksilver mines at Terlingua, Texas.

Dr. Schuyler S. Wheeler returned on the *Baltic* from a short trip abroad September 1.

Mr. H. N. Bowen has resigned as superintendent of the Annie Laurie mine at Kimberley, Utah.

Mr. John B. Farish has returned to Denver from a six weeks' holiday on the Lakes and St. Lawrence.

Mr. W. Randolph Van Liew is in charge of the Caucasus Copper Co.'s smelter at Dransoul, Asia Minor.

Mr. G. B. Wilson, of Tong Shan, China, will shortly arrive at his home at Bakersfield, California.

Mr. Thos. L. Darby recently left Denver for Goldfield, Nev., whence he will go to Los Angeles, California.

Mr. H. Kilburn Scott has recently been reporting on minerals in the Himalayas, near the Thibetan frontier.

Mr. H. A. Keller left New York on September 7 to proceed to Santiago, Chile. He will return in January.

Sir William Ramsay, president of the Society of Chemical Industry, arrived on the *Baltic*, September 1.

Mr. E. H. Liveing has been appointed resident consulting engineer to the Associated Mines at Kalgoorlie.

Mr. E. R. Woakes, mine manager at the Linares Lead Mining Co., in Spain, has been on a visit to London.

Mr. A. C. Massey, superintendent of the Model Mining Co., in Yavapai county, Ariz., is on a visit to Colorado.

Mr. Geo. W. Maynard has returned to New York from the examination of chrome iron deposits in Newfoundland.

Mr. H. H. Webb, consulting engineer of the Consolidated Gold Fields Co., of South Africa, Ltd., is now in this country.

Mr. C. W. Connors has been elected instructor in civil engineering at the Missouri School of Mines and Metallurgy.

Dr. Böttger, docent for physical chemistry in the university of Leipzig, has been called to the Massachusetts Institute of Technology.

Mr. W. W. Garrett has been elected professor of chemistry and metallurgy at the Missouri School of Mines and Metallurgy.

Mr. George Hardy, who has been examining mines in Sonora, Mex., during the past month, has now returned to Carnegie, Pennsylvania.

Mr. W. A. Prichard passed through New York on August 27, and sailed from San Francisco, en route to Australia, on September 6.

Mr. Henry Louis, professor of mining at the Durham College of Science, returned to England by the *Kaiser Wilhelm II* on September 6.

Mr. M. R. Lancaster has returned to this country from Siam, where he has been superintending the development of extensive tin mines.

Mr. George D. Blood has been appointed chief engineer of the United States & Nicaragua Co., with headquarters at Yauli, Segovia, Nicaragua.

Dr. R. de Neufville, of the Metallurgische Gesellschaft, of Frankfort, Germany, is in New York. He expects to stay in this country for several months.

Mr. Walter H. Bunce has been appointed chief engineer of the American Mining Co., with headquarters at Port Deitrick, Cape Gracias, Nicaragua.

Mr. V. B. Sherrod, general manager of the Nueva Australia and Nuevo Porvenir mines of Guanacevi, Durango, Mex., has resigned and will go to Guanajuato October 1.

Geh. Oberbergrat Meissner, of Berlin, counselor to the Prussian Ministry of Industry and Commerce, is in this country to visit the St. Louis World's Fair and study American coal mining practice.

Mr. Jules Goujon, an iron manufacturer of Moscow, is visiting the principal iron and steeel plants in this country. He will attend the meeting of the American Institute of Mining Engineers at Duluth.

Mr. Garry B. LeVan, formerly superintendent of the Hall furnace of the Carnegie Steel Co., at Sharon, Pa., has been appointed superintendent of Heckscher Brothers' stacks at Sweedland, near Philadelphia.

Mr. Thomas Thompson has resigned as foreman melter in the South Sharon, Pa., plant of the Carnegie Steel Co., to become superintendent of the open-hearth department of the Tennessee Coal, Iron & Railroad Co., at Ensley, Ala.

Mr. Edward Walser, who has been in charge of the cyanide department of the Dorcas Mining, Milling & Development Co., at Dorcas. Colo., has resigned to become metallurgist of the Montana Zinc Co., at Walkerville, Montana.

Mr. Oscar Halvorsen, superintendent of explorations at the Government coal mines on Batan Island, P. I., who is home on furlough, passed through New York city this week to attend the sessions of the National Geographical Society at Washington.

OBITUARY.

Otto M. Rosendale, a mining engineer, was suffocated in a fire at Portland, Ore., August 26.

Edward Atlee Schoen, who, with his father, Charles T. Schoen, perfected the steel car, died August 29, at Saranac Lake, N. Y., of a complication of diseases, aged 38 years.

Henry Brinton Coxe died August 31 at Brussels, Belgium, supposedly from rheumatism of the heart. Mr. Coxe was a member of the firm of Coxe Brothers & Co., coal operators, of Philadelphia.

Walter Stewart Church, civil and mining engineer, died August 30 at Geneva, N. Y., aged 72. In 1861 he was appointed by the Peruvian Government Engineer of State, wtih headquarters at Lima. He made the first survey of the old Inca capital of Cuzco. Later he was employed by various mining companies, but gave up mining engineering in 1883 to take charge of the record department of the Croton Aqueduct Commission.

SOCIETIES AND TECHNICAL SCHOOLS.

University of Pennsylvania.—Joseph Wharton, founder of the Wharton School of Finance of this University, at Philadelphia, has increased its endowment from $200,000 to $500,000.

University of Idaho.—It is proposed to add a metallurgical laboratory, equipped with suitable machinery, at the School of Mines of this institution, at Moscow. The machines and laboratory have been designed under the direction of Dr. A. S. Miller, who is in charge of the department. The plant will cost about $25,000.

TRADE CATALOGUES.

In bulletin No. 9 the Jeffrey Manufacturing Co., of Columbus, Ohio, incorporates instructions for the use of the direct-current electric generators which it manufactures.

Catalogue No. 11, revised, of the Lawrence Machine Co., of Lawrence, Mass., enumerates some of the advantages of the Lawrence pump. There are excellent illustrations of these pumps and their parts.

The Pacific Tank Co., of San Francisco, Cal., has spared no pains in making its catalogue No. 6 a complete and attractive volume. It contains prices and descriptions of cyanide plants, supplies and tanks of every description, for mining purposes.

The Westinghouse Machine Co., of East Pittsburg, Pa., has put together the interesting results of a test made by a 400-kw. Westinghouse-Parsons steam turbine in December, 1903 The results are a most favorable commentary on the efficiency of this engine.

One of the most attractive catalogues that has recently come to us is Catalogue No. 2, of the Keystone Driller Co., of Beaver Falls, Pa., making prospecting drills of the churn type. The contents are intelligently prepared, and there are excellent illustrations showing the portability and efficiency of the company's drills.

Jenkins Bros., of New York, have prepared a little book, entitled 'Valve Troubles and How to Avoid Them.' The first part is devoted to a summary of the difficulties commonly encountered in the installation and use of valves, together with some suggestions for the remedy of such difficulties, while the balance of the book is given up to the illustration and description of the principal types of valves manufactured by Jenkins Bros.

The firm of Henry R. Worthington has published a small map showing the location of its old works in South Brooklyn, the offices in Manhattan, and the new works at Harrison, N. J., with the inter-communicating lines of transportation. The old works were founded in 1840, and now cover about 4.5 acres and employ 2,000 men. The new plant occupies a 34-acre tract, has 18 acres of floor space, and will accommodate 6,000 workmen. It is said to be the largest industrial plant near New York, and embraces the latest improvements in production engineering.

INDUSTRIAL.

The Yorkshire Iron & Coal Co., of Tingley, near Leeds, Eng., has put in gas engines of the Cockerill type to be driven by coke oven gas.

The El Paso (Tex.) Mine & Smelter Supply Co. has closed a contract with a company at Benson, Ariz., for a 250-ton standard smelting plant.

It is announced that the reduced freight rates on iron and steel materials from Pittsburg to the seaboard for export, granted some time ago, will remain in effect until January 1.

The Ingersoll-Sergeant Drill Co., of New York, has secured a large contract from the Chilean Government for a compound air compressor and a number of pneumatic tools for one of the Chilean shipbuilding yards.

The Litchfield Foundry & Machine Co., Litchfield, O., has made improvements and enlarged its plant. A new Whiting cupola has been installed in the foundry, and new lathes and a 300-ton hydraulic press will be added to the machine shop equipment.

The Great Lakes Engineering Works, of Detroit, Mich., reports more than the average number of inquiries in the past few weeks for machinery, including vertical engines, vertical air compressors of the larger sizes, as well as marine engines and steel ship construction.

The Westinghouse Co. has secured a fair-sized turbine order from the Northern Electric & Manufacturing Co., of Montreal, Can. Orders for steam engines have also been received from the Panama Railway Co., Colon, Central America; Iquique, Chile, and Sagua la Grand, Cuba.

The Improved Mineral Smelter Co., of Spokane, Wash., has closed a contract for a 100-ton plant for the Turk Mining Co., of Washington. The company has several contracts for erecting plants, among them those of the Crystal Mining Co., of Spokane, and the Almeda Mining Co., of Grants Pass, Ore.

The Buffalo & Susquehanna Railroad Co. is extending the road from Belmont, Allegheny county, N. Y., to Buffalo, to connect with the new plant of the Buffalo & Susquehanna Iron Co., and it will expend $1,000,000 in the establishing of extensive freight terminals at Buffalo. An extension of the road to Pittsburg is also contemplated.

The Lucky Tiger Combination Gold Mining Co., in the Moctezuma district of Sonora, Mex., has closed a contract with Roy & Titcomb, Inc., of Nogales, Ariz., for a 100-ton concentration mill, complete, with power. This mill, when completed, will represent an outlay of more than $100,000, and will be one of the most efficient reduction plants in the southwest.

The Tula Iron Works, Mexico, has been leased by Ralph H. Beach, of New York, and George Townsend, of Indianapolis, Ind., for ten years with an option to purchase for $700,000 within that period. J. F. Jones, manager of the Phœnix Rolling Mills, Pittsburg, has been appointed general manager. The new lessees expect to expend over $500,000 in improvements.

The Denver Engineering Works Co. announces that in order to expedite the handling of its business Lyman P. Hammond has been appointed as sales manager. Mr. Hammond has resigned his position as manager of the Denver branch of the Crocker-Wheeler Co., and will take charge of all work relating to the sale of the Denver Engineering Works Co.'s products after September 15. He will be located at the city office of the company, Nos. 604-605 McPhee building, Denver.

The Ingersoll-Sergeant Drill Co., of New York, offers five prizes for advertisements best suited to the requirements of the company. Any stockholder or employee of a company, firm or individual using Ingersoll-Sergeant machinery, or any one in the employ of the Ingersoll-Sergeant Drill Co., will be at liberty to submit suggestions. The prizes will be as follows: First prize, $25; second prize, $10; third, fourth and fifth prizes, $5 each. In addition, a prize of $10 will be awarded for the best and most original suggestion for keeping the name of the Ingersoll-Sergeant Drill Co. before the public.

GENERAL MINING NEWS.

ARIZONA.

COCHISE COUNTY.

Benson.—The company building a smelter at this place has ordered a 250-ton smelting plant from the El Paso Mine & Smelter Supply Co.

Calumet & Arizona.—Captain James Hoatson has been elected vice-president of this company, to succeed the late John S. Dymock. Operations continue active on the entire group.

Calumet & Cochise Development Co.—This company has forfeited its option by failure to meet a payment of $12,500 due August 17.

Shattuck-Arizona.—The shaft in this mine at Bisbee is now in 100 ft. Hoisting works are being installed.

GILA COUNTY.

Gibson.—Steam hoisting machinery has been ordered for this mine at Globe. Shipments to the Old Doimnion smelter have been lessened pending the blowing in of the new smelter.

MARICOPA COUNTY.

Relief.—A gold mill of 30 tons capacity is now running at this mine, 23 miles northwest of Phoenix. The mill is a roller process, and will, if necessary, use the cyanide process.

PINAL COUNTY.

Christmas Gift.—The final payment on the $60,000 purchase price of this mine in the Cusa Grande district has been made by the Plata Cobre Co. George T. Greaves is superintendent.

CALIFORNIA.

AMADOR COUNTY.

Bay State Mining Co.—At this property, Plymouth, W. W. Worthing, manager, drifting north and south at the 1,000-ft. level on two veins is being done, and 10 stamps are busy.

Kennedy Mining & Milling Co.—At this property, Jackson, W. Smith, superintendent, a new furnace is being built for the chlorination works. The old furnace is to be reconstructed when the new one is ready for work.

Zeila Mining Co.—The mill at this mine, Jackson, is being arranged so that 30 of the stamps can be run by electric instead of water power. The other 10 stamps will still be run by water power.

CALAVERAS COUNTY.

Big Tree Mining Co.—Considerable work is being done on this property at Murphy's. The foundation for the new smelter is nearly completed.

New York & California Dredging Co.—This company has been organized at Oroville and has closed a deal for the machines and lands of the Marigold Dredging Co., 6 miles from Oroville. Karl Krug, of the Lava Beds Dredging Co., will act as superintendent.

Oroville.—Five more gold dredgers are being built at this place, and about 100 men are at work upon them.

Utica Mining Co.—Work is progressing rapidly on the new 40 stamp mill of this mine at Angels.

EL DORADO COUNTY.

Eagle Bar Placer Mining Co.—This company, which recently bought the Channel Bend property, with adjoining claims, on the American river, near Josephine, is preparing to put on a large force of men.

Landecker.—It is reported that Pennsylvania men have agreed to purchase the property, owned by Clark & Wright, for $250,000. A mill is to be put up and Howard Plummer is to superintend operations.

LOS ANGELES COUNTY.

Native Sons Gold Mining Co.—This company, operating on the San Gabriel river, intends to build a permanent road to the mines. A quartz mill is being put up.

MADERA COUNTY.

Magnet Mining Co.—At this mine, Magnet, Robt. Walker, superintendent, it is expected that extensive operations will shortly begin.

MARIPOSA COUNTY.

Mariposa Land & Commercial Co.—At the Princeton mine of this company the shaft has been opened up for about 100 ft. It is being repaired, having sustained damage during the recent fire. The machinery is also being put in order.

Roy.—At this mine, Indian Gulch, W. B. Sayers, superintendent, a hoist and other machinery are to be put in. A mill has already been installed.

NEVADA COUNTY.

Badger Hill.—This old mine is being opened by W. H. Hicks, Chas. Hopkins and Mr. McConnell. The old 120-ft. shaft is being pumped out and will be sunk deeper.

Charronat.—A new hoist suited for work to a depth of 2,000 ft. has been placed on this mine at Canada Hill.

New York-Grass Valley Mining Co.—At this mine, Grass Valley (formerly the Perrin), 10 stamps are to be added to the mill. The mine is paying over its expenses under supervision of Mr. Root.

PLACER COUNTY.

Three Stars Mining Co.—An electric tramway 2,000 ft. long has been built from the Almont shaft on this property, near Auburn, to the Three Stars 20-stamp mill. The shaft is being unwatered. B. F. Hartley is superintendent.

Virginia.—R. G. Hanford, of Folsom, has started a Keystone drill, prospecting some land considered valuable for dredging near the old "boom."

PLUMAS COUNTY.

Peter.—R. E. Carswell, of Minneapolis, has a bond on this quartz mine. Charles Adams, superintendent.

SAN BERNARDINO COUNTY.

Fearnot Mining Co.—Another mill will be installed on this mine at Victor.

SAN DIEGO COUNTY.

Nobles Gold Mines Co.—At this property, Descanso, J. A. Wauchope, manager, compressors and air drills have been installed. A promising discovery has been made on the 100-ft. level.

SAN LUIS OBISPO COUNTY.

Rigdon.—This quicksilver mine, near Cambria, is under bond to a Los Angeles company for $25,000 and is being thoroughly prospected.

SHASTA COUNTY.

Redding Gold & Copper Mining Co.—The office of this company, operating on Clear Creek, will hereafter be at Redding. The new directors are: C. S. Winchell, president; T. M. Gilbert, vice-president; David Russell, J. H. Creighton, P. M. Rasmussen and W. F. Aram.

Reid.—A body of rich ore is reported in the Hendy tunnel of this mine, at Old Diggings, now being worked under bond by James Sallee and D. B. Hunt.

Sunny Hill Mining Co.—At this property, L. F. Barlow, superintendent, a mill and cyanide plant are being installed. The ore is not free milling, and the present plant is, to some extent, experimental. If the system adopted proves favorable a 2,000-ft. tunnel will be run from the creek to tap the ledge at 400 ft.

SISKIYOU COUNTY.

Eliza.—At this mine, north fork of Humbug, the ledge has been cut again 160 ft. lower than the old workings and proves to be rich.

Fernandez.—This hydraulic mine, on Cherry creek, has made a $5,000 clean up for its season's run. Cutler Page, of San Francisco, has an option on the mine.

Headwaters Mining Co.—Good prospects are reported in the end of the lower tunnel of this property, at Humbug, on striking the walls of the Lucky Jack ledge.

Jenny Lind.—Some very rich ore has been encountered in this mine, on the south fork of Humbug.

Morrison & Carlock.—At this quartz mine, Quartz valley, the 10-stamp mill is nearly completed.

Mount Vernon.—This mine at Cherry Creek, near Yreka, continues to show good paying quartz. The foundation for the new 10-stamp mill is nearly ready.

SONOMA COUNTY.

Culver Baer Quicksilver Mining Co.—It is reported that this company, near the Geysers, has struck the main lead in the old Oakland mine. This mine has been closed for some 20 years and was only recently reopened. The old tunnel was found to have caved very little, and good ore has been found.

TRINITY COUNTY.

La Grange Mining Co.—This company is about to expend a large sum to rebuild its 11-mile stretch of flume to perfect its water supply system. There are on the property 11 miles of flume, 10 miles of ditch, a tunnel a mile and a half long big enough to carry the ditch, and an immense steel siphon. This latter is 30 in. in diameter, and runs from a 1,100-ft. elevation on one mountain side across the valley and over a river and up to 1,000 ft. elevation on the other side.

Mooney Consolidated Mining Co.—This property, four miles down the river from Minersville, after lying idle several years, is about to be reopened by A. W. Cornwall, son of the owner.

Unity Hydraulic.—This hydraulic property, three miles from Minersville, is to be reopened at once and operated during the winter. The mine has been idle some years.

Yellow Rose.—A rich ledge has recently been found in this mine, at Coffee, and a cyanide plant will be built. The new ledge was a "blind" one, and was discovered in the tunnel. Development work is in progress.

TUOLUMNE COUNTY.

Confidence.—At this mine, Confidence, 75 men are working. Wood and timber supplies for the winter are being provided.

Longfellow Mining Co.—The improved machinery recently put on at this mine will permit sinking the shaft to 2,000 ft. depth.

Starr King.—This mine, in charge of H. P. Medlicott, produced enough gold in its last 18 days' run to pay off the labor bills held against it.

COLORADO.

BOULDER COUNTY.

Gold Hill Mines Co.—This company, at Gold Hill, has secured a lease and bond of the Black Swan 5-stamp mill at Salina for the purpose of treating the output of the Cash mine.

Lincoln Mining & Development Co.—This company has purchased the claims formerly owned by Copeland Bros., in the Sugar Loaf district. Development work will begin at once.

CHAFFEE COUNTY.

Camilla Gold Mining Co.—The tunnel at this company's property at Hancock is in Pomeroy mountain 600 ft. Machinery has been installed.

Salida Copper Gold Co.—The leading plant of this company at Salida has started operations.

CLEAR CREEK COUNTY.

Cleveland Mining & Milling Co.—A good strike is reported in the Morning Star mine of this company at Idaho Springs.

Truxall Consolidated Mining Tunnel Co.—This company has secured 35 claims near Tawson. Work will be done with a tunnel connecting with the Pioneer claim.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Gilpin Ore Shipments.—Shipments of smelting and crude ores, mill tailings and concentrates from the Black Hawk depot to the Denver smelters and outside points of treatment for July were 253 cars, or 5,070 tons, a gain of 43 cars, or 870 tons, over the preceding month, an increase of over 20 per cent.

Conqueror.—The Benzie Investment Co. has taken this property, at North Empire, consisting of 110 acres of patented ground, and has begun developments. The property was formerly operated by tunnels and with placer workings, and nearly $1,000,000 has been taken out in gold. The company will sink a three-compartment vertical shaft and gain additional depth. Ores opened up in the main tunnel concentrate three into one, giving values of up to $70 to the ton, and the 40-ton concentrating plant is in shape for handling the ores. W. Ballantyne, Central City, is manager.

Fairfield Mining Co.—Arrangements are being made for the installment of a Norwalk air compressor at the Fairfield mine, in Russell district. Dr. W. M. Nickerson, Central City, Col., is manager.

Gold Dirt Mining Co.—The Peterson 15 slow-drop stamp mill, in Lump gulch, has been leased for this mine, in the Independent district. The tailings from 5 stamps will be cyanided, but those from the other 10 stamps will be shipped to the smelters. There are about 1,200 tons of milling ores on hand. W. H. Knowles, Rollinsville, is manager.

Gregory & Bobtail Mining Co.—A Rand compressor of the imperial type No. 10 is being installed in the Boston mill of this company, at Black Hawk. It is a 20-drill, but can be speeded up to 36-drill capacity, weighs 35 tons and cost about $10,000. It is one of the largest plants in the State, and when it is running Manager O. B. Thompson intends to carry on a large amount of development work. The Cook shaft is over 1,400 ft. deep.

Moose.—A new shaft building has been erected and machinery installed at this mine, in Elkton gulch. The main shaft is down 170 ft. and is to be sunk 200 ft. deeper. The ores carries a good percentage of copper and silver values, besides some gold. Pat McCann is manager, residing at Central City.

Nashville and John L.—Operations have been resumed at these properties by Colorado and Eastern lessees, under management of G. H. Brown, Russell Gulch, Col. The main shaft is down 160 ft. and is to be sunk 200 ft. deeper at once. A new plant of machinery and buildings have been recently put up.

Newhouse Tunnel.—It is reported that Contractor Knowles is making at the rate of 9 ft. per day in driving this bore.

Vesuvius.—Bramlett Bros., of Globeville, Col., have made a good strike on this group, on the north side of South Boulder creek, and in the Wisconsin district, assays running up to as high as 101 oz. gold to the ton. These values came out of a shaft less than 30 ft. deep.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Leadville Ore Output.—August tonnage amounted to 70,000 tons of all classes of ore. The Arkansas Valley smelter handled 50,000 tons; the zinc ore and concentrates amounted to 8,000 tons.

Blue Ribbon.—As development proceeds the ore shoot becomes wider and carries better values, and there is no doubt that the lessees have opened the Cleveland ore shoot. About 30 tons daily are shipped.

Big Six.—Several good pockets of ore have been opened at this mine in Lower Evans gulch.

Corona.—This mine in California gulch is shipping 30 tons daily of a good sulphide carrying considerable lead.

Fanchon.—The new machinery at this mine in Sugar Loaf district is nearly installed, and sinking will commence shortly. The shaft will be put down another 200 ft., when drifting to the vein will be done. The Dinero, adjoining the Fanchon, is shipping a fair grade of ore, and a contract has been signed to ship 200 tons, which is now being sent out.

French Mountain.—From the Ideal group and the Gold King, regular shipments are going to the smelter, and the returns give 5 oz. gold per ton.

Ibex.—The lessees are shipping a quantity of ore of a good grade, while the company sends out the usual amount of ore from No. 4 shaft.

Little Sister.—The drill hole at this mine, Lower Rock hill, has reached 485 ft.

Ollie Reed.—The new hoist is in place and shaft sinking on the Howard ground has begun. From the old shaft the mine is producing the usual tonnage, and the values continue to hold up well in gold.

Rock Creek.—A claim was opened in the Blue River district recently by Horn & Dunnel, from which ore running 1,000 oz. silver to the ton was found.

LA PLATA COUNTY.

Boren Gulch Mining Co.—A good strike of gold, silver and galena is reported in this company's Colonial claim at La Plata. H. C. Demming is manager.

OURAY COUNTY.

Angel Gold Mining Co.—A strike of good ore is reported at this company's property on Whitehand mountain, about four miles from Ouray.

Bankers' Consolidated Mining Co.—This company has received 11 claims in the Mt. Sneffels district from E. I. Owens for a stated price of $18,500.

Joker.—A compressor of 10-drill capacity and an electric light plant are being installed at this mine at Ouray.

Waldron Mining Co.—This company is installing a plant of machinery on its property at Mineral Point.

SUMMIT COUNTY.

Jessie.—The 40-stamp mill at this mine has been temporarily closed down to permit the installation of a 15-ton air compressor and three or more Wilfley tables.

SAN JUAN COUNTY.

Excelsior.—These properties, near Hancock gulch, are now in the hands of Denver people.

Silver Ledge.—The mill at this mine at Silverton is producing about 30 tons of zinc, lead and copper daily.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Mining conditions.—The large mines are working as usual, though nothing startling is being done. About the only large properties not working are the Golden Cycle and the Hull City placer. The former is closed down on account of litigation between two factions of the stockholders and the latter because of trouble between the company and the lessee. A large number of leasers are at work throughout the district and some are making money. At present there appears to be more work going on in the district than at any previous time. All the men working are non-union men, and nearly 5,000 cards have been issued by the Mine Owners' Association, though, of course, all these men are not working. Some men are idle, others have left the district. Any man not known to be an agitator or an ore thief, and not a member of the Western Federation of Miners, can get a card. On the whole, the mining outlook is very good.

Drainage Tunnel.—No work is now being done. The flow of water is large, though less than some time ago. The tunnel has proved a success for the mines that it was intended to drain. There is some talk among mine owners of starting a new tunnel to tap the mines at considerable greater depth, though so far nothing definite has been done except making surveys.

Elkton Consolidated Gold Mining Co.—The outlook for this property is good; work goes on steadily at the eighth level, which is now entirely free from water. The company is shipping considerable ore and a number of leasers are shipping some. The company is now out of debt and has a good reserve in the treasury. The drainage tunnel has been of great service.

Findley Gold Mining Co.—This mine, now one of the largest shippers in the district, is well equipped with hoisting plant and compressor. The extension of the veins of the Hull City placer is worked. J. S. Murphy is in charge.

Gold Cycle Mining Co.—It is again reported that this large property, which has been idle for some time because of a stockholders' quarrel, will start work again.

Stratton's Independence, Ltd.—A number of leases are worked on this property and some are shipping ore. There seems to be a feeling that the conditions of the leases are rather stiff, and the demand for them is not as great as it was.

Zenobia.—A strike of very rich ore has been reported in this property, on Bull Hill, under lease to James Wright, who made considerable money out of a lease on the Thompson.

IDAHO.

CUSTER COUNTY.

Greyhound.—A 50-ton water-jacket smelter is to be installed at this mine on Greyhound mountain, in the Seafoam mining district. The mill was purchased from the Colorado Iron Works.

SHOSHONE COUNTY.

16 to 1.—The repairs on the mill at this mine at Wallace will soon be completed, and operations resumed. T. Anderson is manager.

Empire State-Idaho.—The shoot in this company's property at Wardner has been opened 500 ft. below the Sweeny tunnel.

Evolution Mining Co.—This company, near Osborn, has temporarily shut down during repairs to the machinery.

Snowshoe Mining Co.—This company is to build a road to its property up Gentle Annie gulch above Mullan.

Standard.—The shoot in this mine, in the Coeur d'Alenes, has been developed for 1,300 ft. on the level, 450 ft. below the tunnel level.

WASHINGTON COUNTY.

Black Lake.—The mill on this property, at Landore is nearly completed. The tram is being overhauled, and the plant will be started in a short time.

KANSAS.

CHEROKEE COUNTY.

(*From Our Special Correspondent.*)

A Chicago company is building a dam across Spring river, near Lowell, Kan., 10 miles from Joplin, from which it is expected to generate 7,000 h.p., and contracts are now being made with mining companies for electric current. The Underwriters' Land Co., at Webb City, has contracted for 325 h.p. daily to supply its pumps and mill, and is now in the market for motors. Power is promised the mine operators early in November. Should the plan meet the endorsement of mine operators, it is proposed to build another dam, lower down Spring river, near Baxter Springs, about 16 miles from Joplin.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Calumet & Hecla.—Mineral from the Stanton mines, excepting the Baltic, is being smelted by this company at its Lake Linden plant until the new Michigan smelter is in full commission.

Champion.—Excavating for the foundation of the addition to the stamp mill at Freda is completed. The building will be 88 ft. long, constructed of steel, and will contain two heads. The framework will be delivered by the Wisconsin Bridge & Iron Co., of Milwaukee, Wis., in three weeks; two Stirling water-tube boilers, purchased from the Trimountain Mining Co., will be installed. The new hoist at D shaft will be completed shortly. The engine has been shipped from the shops of the Nordberg Manufacturing Co., of Milwaukee; it is a conical drum, duplex cylinder engine with cylinders 24 in. in diameter and 60-in. stroke, capable of hoisting a 6-ton load from a depth of 4,000 ft. This is the first permanent hoist to be installed at the mine.

Elm River.—Exploratory work continues, two drills being in commission, one on the Winona lode at the 525-ft. level showing a formation from 20 to 25 ft. wide. A crosscut is being driven on the 525-ft. level to tap another lode. Nothing of permanent value has been revealed to date.

Mayflower.—A small force is employed; the work consists of drifting on a lode reached by a crosscut at a depth of 560 ft. Results have not been very favorable.

Michigan Smelting Co.—Three furnaces are in full blast at the new plant west of Houghton, making a high-grade product. Champion mineral is returning over 70% refined copper, showing a marked improvement over last year's average.

Old Colony.—Operations are confined to drifting on a lode encountered by a crosscut from No. 1 shaft at a depth of 580 ft. A diamond drill core shows encouraging features, though actual work is not favorable, and work will be continued.

Quincy.—Improvements at the smelting plant on Portage lake near Hancock will be completed by October 1. Besides closing a contract with the Franklin Mining Co. for treating its mineral, the Quincy has arranged to smelt the product of the Centennial Copper Mining Co. The output of the Allouez Mining Co. will also be handled when that mine becomes productive.

Superior.—Sinking in the new 2-compartment shaft on section 15 is well under way. It is going down on the pitch of the lode.

COPPER—KEWEENAW COUNTY.

(*From Our Special Correspondent.*)

Arnold.—All the blacksmith and machine shop supplies, skip rails and miscellaneous mine material have been disposed of and are being hauled away. The machinery has been being sold off for the last few years, and very little remains.

Mohawk.—Preparations are under way for starting a new shaft, No. 5, 1,800 ft. south of No. 4. A test pit is being opened and as soon as the thickness of the overburden, dip of the lode, etc., have been determined, the engineers will locate the collar of the permanent shaft. The rich rock from the Ahmeek on the south leads to the belief that No. 5 shaft will open the Mohawk's richest territory. No. 1 shaft is sinking below the 10th level. No. 2 is sinking to the 10th level. Both of these shafts will be equipped with Nordberg hoisting engines capable of hoisting from 4,000 ft. A stone engine house is under construction, and a new boiler house being erected. At No. 3 shaft the structure to replace the rock and shaft house destroyed by fire will be completed and production resumed in six weeks. A Nordberg engine, with cylinders 12 by 24 in., has been installed to operate the rock house machinery. No. 4 shaft is sinking to the 7th level. The new equipment is giving excellent service. The new 60-drill Ingersoll-Sergeant compressor furnishes air for all the drills, the smaller and less economical machines being closed down. The stamp mill on Traverse bay is operating three heads and treating 1,500 tons of rock daily. The capacity will be increased by the installation of three pairs of crushing rolls from the Nordberg Manufacturing Co., of Milwaukee. There is room for a fourth stamp, which will be installed by the time the new No. 5 shaft begins production.

MINNESOTA.

IRON-MESABI RANGE.

(*From Our Special Correspondent.*)

Negotiations are under way for the sale of the exploration in lot 6, section 6T.58R.15, to the Oilver Iron Mining Co. This is a small but excellent ore body, and was explored by people at Virginia.

D. T. Adams and associates have begun exploration in the north tier of sections in T.58-R.15, from which they drew out some years ago, after finding the Meadow mine.

The exploration conducted for some months by G. A. St. Clair in section 6T.58R.15 has shown up about 6,500,000 tons of excellent non-bessemer ore. This will probably be opened for mining the coming year. The ore is coarse and hard.

Elba.—This mine, at McKinley, Elba, is shipping gradually from stock, but not fast enough to take away the 65,000 tons on hand, much of which will go over the winter. Corsica, an adjoining property, has a stock pile of about 20,000 tons that has not been touched. These are both Pickands, Mather & Co. properties.

Grant.—Bids for stripping this mine, on the central Mesabi, are not yet opened, but contracts will be made in a short time. It is estimated there are 4,000,000 yd. of overburden, but this probably will not be all included in the first contract. The overburden is up to 70 ft., and the stripping will be one of the largest jobs ever undertaken on the range.

Howard.—The name of this mine, being developed by the Oliver Iron Mining Co., has been changed to Myers. It was formerly the Niles, and so appears on most of the range maps. It is in the nw ¼ of the se ¼ of section 22T.58R.20.

Malta.—Sales of ore are sufficient to operate the property all this season and into the Winter. The sales have been at a better price than has prevailed in the standard Mesabi bessemer list for some time, and are encouraging for others of like character. The mine was reopened this week and 200 men will be employed for the year.

Monroe.—At this mine, where the Oliver Iron Mining Co. is stripping a large surface for milling, No. 1 shaft house is well along. It is set on concrete piers, an innovation for the Mesabi. Another shaft house for Monroe, and one for Tener, the western end of the same mine, are under way. Tener is a 40-acre tract, under a separate lease, and is distinct from the traffic contract with the Great Northern, under which Monroe works. This road is grading to Monroe shafts, the grade being of earth taken out of Leonard pit, a mile west, where the Drake & Stratton Co. is stripping heavily. Tener ore will be handled by the Duluth, Mesabi & Northern road, which is now at the property.

MISSOURI.

JASPER COUNTY.

(*From Our Special Correspondent.*)

United Zinc Companies.—This company is sinking several shafts for the deeper run of zinc ore at Aurora, indicated by numerous drill records. The ore was encountered at 175 to 250 feet. This company recently installed a new mill at its zinc mine at Diamond, between Joplin and Granby, which is making a carload of concentrates weekly. At the Peacock Valley mines of the company, at Badger, work in all the shafts has been resumed, after a shutdown of 30 days, due to July rains flooding the mines.

MONTANA.

DEER LODGE COUNTY.

(*From Our Special Correspondent.*)

St. Thomas Group.—Hugh Daly and Andrew Nelson, of Anaconda, have secured this property, near Georgetown, on a lease and bond for $30,000. Five men have been at work three weeks. Two cars of gold ore are sacked ready for shipment. A new strike 15 in. wide, showing considerable free gold, is reported. The lead in the tunnel is 15 ft. wide, but is mostly low grade.

Southern Cross.—Lucien Eaves is operating this property under a lease from H. L. Frank, and shipping 60 tons of ore a day to the Washoe Works at Anaconda. The ore is a heavy iron oxide, with a gold value anywhere from $6 to $12 per ton. Twenty teams are hauling it 12 miles to the railroad, 7 miles above Anaconda.

GALLATIN COUNTY.

(*From Our Special Correspondent.*)

Montana Corundum Co.—Neither the mines nor the mill of this concern are in operation. The company became involved financially early this year and has not succeeded in getting its affairs straightened out.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Black Jack.—A strike of galena ore is reported at Grassroots, on this claim, near Corbin, owned by Emil Stromberg, who has stripped the ore body for a distance of 40 ft., where the pay shoot is from 3 to 5 ft. wide. The assay value runs 30 per cent lead, 8 oz. silver and $12 gold. So far the depth is only 8 ft. J. P. Porter, of Helena, has taken a bond on the property at $40,000.

Cataract Copper Co.—After a brief run the smelter has closed. The plant is about 10 miles from Basin, near the mouth of Jack creek.

PARK COUNTY.

(*From Our Special Correspondent.*)

Crevisse.—Butte men are making an examination of this old property, near Jardine. It has remained idle since the old First National Bank of Helena acquired it some years ago.

SILVER BOW COUNTY.

(*From Our Special Correspondent.*)

Reins Copper Co.—A reported strike of 2 ft. of copper glance is announced in the cross-cut on the 800-ft. level of this property, at Meaderville. The funds for developing the property were largely raised in Pittsburg, Pa.

NEVADA.

ESMERALDA COUNTY.

Bowers & Kernick.—It is reported that a vein of good ore 20 ft. wide has been opened in the 200-ft. level of this mine at Goldfield.

Sandstorm.—A strike on this claim, a lease from the Tonopah Mining Co., at Goldfield, is reported to have caused a rush that no mining camp in the West has seen in years. Phenomenal values are reported.

Velvet.—A good strike is reported at this mine at Goldfield.

Welch.—This lease on Vernal No. 2 is reported to be still in good ore.

LINCOLN COUNTY.

Golden Eagle.—It is reported that this group of 12 claims, near Moapa, has been sold for $15,000 to Denver and Colorado Springs men.

Twin Peak.—An option on this group of gold-copper claims, near Goode Springs, has been given to Los Angeles men for $8,000.

NEW MEXICO.

GRANT COUNTY.

Comanche Milling & Mining Co.—The smelter of this company, at Silver City, is nearly completed. It will have a capacity of 200 tons daily.

SOCORRO COUNTY.

Mogollon Gold & Copper Co.—This company's mill, at Cooney, is again in operation after a shut down of several weeks on account of the deferred rainy season. Water is now to be had in abundance.

PENNSYLVANIA.

ANTHRACITE COAL.

Stevens.—This colliery, at West Pittston, which has been idle for two months, owing to an extensive mine cave, has resumed operations.

BITUMINOUS COAL.

H. C. Frick Coke Co.—Extensive improvements will be made at the Brownfield and Redstone plants of this company at Connellsville.

Keystone Coal Co.—This company will work the mines at Meyersdale formerly operated by the defunct Continental Coal Co. The Keystone company, which owns the mines, opened them over 50 years ago.

Pittsburg, Shawmut & Northern Co.—It is reported that the Erie Railroad Co. has the mines and road of the company under option. The railroad extends from Hyde, Elk county, to Hornellsville, N. Y., and is 131 miles long. The company owns a large acreage of coal yet undeveloped.

United Coke & Gas Construction Co.—This company has placed an additional battery of coke ovens in operation at its plant at Sharon.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Branch Mint Mining Co.—Three miles of track are being built by this company from the mine to the 120-stamp mill under construction. The company has bought the old Union Hill property at Galena, embracing several thousand acres of ground, and the mill uses the framework erected by that company. James Hardin, of Galena, is general manager.

Clover Leaf Mining Co.—This company has purchased the 350-h.p. engine of the Belt Electric Light & Power Co.

Deadwood Standard Mining Co.—This company has secured a churn drill and will prospect the property with 100 holes. Some excavations will be made to the 600-ft. level to determine the depth of the ore-bearing formation. Ed. Hanschka, of Deadwood, is general manager.

Dizzy Mining Co.—A steam hoist and pump have been installed at this company's shaft adjoining the Omaha ground.

Eleventh Hour.—This property, on Iron creek, has been bonded by George P. Baldwin, of Philadelphia, and a company will be organized to develop it.

Golden Crest Mining Co.—It is reported that all obligations of the company will be met and the mill will resume operations. Robert L. Bailie is president, and Edward Henderson, secretary.

Goldstake Co.—The main tunnel is in 475 ft. An excavation is being made for an air compressor plant.

Hidden Treasure.—The machinery has arrived for the new steam hoist. The shaft is to be sunk 500 ft. A gasoline engine will be used for power.

Omaha Mining Co.—The shaft at this company's mine at Maitland is down 70 ft.

Queen of the Hills.—A test run is soon to be made on the silicious ore recently discovered on this company's property. E. P. Farnham, of Central City, is general manager.

Reliance Gold Mining Co.—At the annual election these officers were chosen: Gen. S. E. Olson, Minneapolis, president; F. W. Bower, Deadwood, vice-president; F. W. Medbury, Deadwood, secretary and general manager; E. E. Bennett, Lincoln, Neb., treasurer. A cyanide plant will be built this fall. The company controls 400 acres of patented ground in the Bald Mountain district.

Ruby Gold Mining Co.—A new shoot of ore is reported discovered on this company's property at Galena. The mill, after the first test run, is being re-modeled slightly. James Conzett, of Deadwood, is general manager.

Tinton Tin Mining Co.—Eighty thousand pounds of tin concentrates have been shipped by this company to Wales for treatment.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Black Eagle Mining Co.—The second Huntington mill of 60 tons daily capacity has been installed at this company's mine.

Empire State Mining Co.—The pumps have been started in the Golden Slipper mine east of Hill City. The property has changed hands.

Golden West Mining Co.—This company has purchased the Nancy Hanks group of claims, east of the Golden West mine. It is owned by George Hastings, Joe Craig and others of Rochford. Two carloads of machinery, consisting of two Huntington mills, a crusher and a large water wheel, have arrived for this company's new mill. A flume 6,000 ft. long is nearly completed. C. E. Curtis, formerly associated with the McCormick Harvester Co., of Chicago, is president of the company and is managing the mine. Ore will be delivered to the mill by a 700-ft. wire tram.

Holy Terror Mining Co.—M. L. Fox, representing A. E. Lee, of South Dakota, at Vermillion, and others, has purchased the sale certificate of this mine. The company was unfortunate several years ago in having accidents in the mine resulting in several damage suits.

TEXAS.

HARRIS COUNTY.

(*From Our Special Correspondent.*)

The Bennett well No. 2 at Humble is down 750 ft. and prospects look favorable. No. 1 was ruined by a gas blow-out.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Stillwell Oil Co.—This company, which has already drilled three unproductive wells near Port Arthur, intends to put down another.

TYLER COUNTY.

(*From Our Special Correspondent.*)

W. H. Whitehead is drilling a well at Sulphur Springs, near Chester.

East Texas Land Co.—This company is drilling a wild-cat at Windsor, 5 miles from Rockland.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Settlements.—Settlements were reported by Salt Lake banks during the week ending September 2, aggregating $438,200.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Blue Jay Consolidated.—Good ore bodies have been uncovered in both the east and west crosscuts. Some of the ore is high-grade copper. The stock is largely held by Salt Lake people.

Estella.—The foundations are in for the 5-stamp mill that the company is building at this mine. Samuel Tarbet, of Milford, is superintendent.

Horn Silver.—The ground has been broken and graded for the foundations for the new Peck zinc plant for this mine at Frisco.

Majestic Copper Mining Co.—This company has resumed operations with E. F. Freudenthal in charge of about 35 men.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Ore Shipments.—During the week ending September 3 shipments aggregated 106 carloads as follows: Bullion-Beck, 4; Gemini, 7; Centennial-Eureka, 49; May Day, 1; Eagle & Blue Bell, 1; United Sunbeam, 1; Star Consolidated, 4; Yankee Consolidated, 4; Uncle Sam Consolidated, 12; Lower Mammoth, 1; Mammoth, 16; Grand Central, 5; Ajax, 3; Carisa, 3; Uncle Sam Consolidated (concentrated), 6.

Balhinch.—A good body of silver-lead ore was encountered in the tunnel at 600 ft. in.

Bullion-Beck.—Leasers in this Tintic property have developed a new and possibly extensive body of silver-lead ore on the 700-ft. level, and the working force has been greatly increased.

Eureka-Hill Mill.—This plant will close about September 15. It has been working on ore from the Gemini mine.

Uncle Sam Consolidated.—The mill is treating about 90 tons of ore daily.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated.—Shipments of copper bullion during the week ending September 3 aggregated 246,674 lbs.

Columbus Consolidated.—The new mill is nearing completion. Unless there is delay in the delivery of the four electric motors, the plant will go into commission about September 15.

South Columbus.—The tunnel is completed for over 600 ft. The management expects that the vein will be cut within the next 100 ft.

United States.—Shipments of copper bullion from the smelter during the week ending September 3 aggregated 245,292 lbs.

Utah Consolidated.—Copper bullion shipments from the smelter during the week ending September 3 aggregated 363,361 lbs.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Daly-West.—This property closed for a few days while a new gallows frame was put in order.

Nelson Mining Co.—This company has been formed at Park City to work the Nelson group in Elkhorn district. The officers are William M. Ferry, president; William H. Nelson, vice-

Ontario.—The management has announced that mining will begin again next week. The new hoist is completed. Pumps have been clearing the lower workings of water.

West Quincy.—This mine is being unwatered preparatory to the resumption of extensive development.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Bingham-New Haven.—This company is sending 50 tons of ore daily to the American smelter in Salt Lake valley.

Galena King.—A 20-ft. body of ore has recently been uncovered in this mine. In other portions of the property large volumes of shipping and milling ore are exposed.

Northern Light.—The cyanide mill at this mine is being dismantled, preparatory to removal to another property.

South Swansea.—This company has contracted to ship its ores to the plant of the American Smelting & Refining Co., in Salt Lake valley.

Stockton.—This company has nearly completed its new water-pipe line. Occasional shipments of first-class ore are being sent to the smelters, and low-grade is being treated at the Honerine mill.

Swansea Mining Co.—A rumor is current to the effect that a deal is on involving the sale of this company's property at Silver City.

FOREIGN MINING NEWS.

AFRICA.

RHODESIA.

The gold output for July, as reported by the Chamber of Mines, was 24,339 oz. bullion, which is 3,937 oz. more than in June, and is the largest reported this year. For the seven months ending July 31, the total was 137,836 oz. bullion, which compares with 141,563 oz. for the corresponding period in 1903; showing a decrease of 3,727 oz. The bullion reported this year was equal to 122,674 oz. fine gold, or $2,535,672 in value.

AUSTRALIA.

VICTORIA.

Broken Hill Proprietary Co., Ltd.—The half-yearly statement shows a profit for the 6 months ending May 31, of £107,698, with net assets of £415,283 and profit and loss a credit balance of £565,534. For construction, £18,646 has been expended during the half-year. Smelting operations at Port Pirie in every way were satisfactory. The bullion output for the half-year has been a record one, with over 35,000 tons produced, an increase of 3,472 tons pig lead, also 62,800 oz. fine silver, over past half-year. In view of the satisfactory results of experiments in the sulphuric acid plant at Broken Hill, it has been decided to duplicate the same. It has been decided to utilize the acid in the manufacture of superphosphates, and it is anticipated, in view of the increasing demand for fertilizers, that the result will be increased revenue. Exploratory work in the lower levels has proved satisfactory. The underground tonnage of ore raised shows a considerable increase over the previous half-year, exceeding all previous records. The salt cake plant has been practically completed, and has a capacity for treating about 2,000 tons weekly.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—Shipments for the week ending August 27 were as follows, in tons: Granby, 8,550; Mother Lode, 3,158; Emma, 1,098; Mountain Rose, 100; Oro Denoro, 33. Total for week, 12,939 tons; total for year to date, 528,419 tons.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—Shipments for the week ending August 27 were as follows, in tons: Le Roi, 1,950; Center Star, 560; War Eagle, 1,260; Le Roi No. 2, 480; Le Roi No. 2 (milled), 300; Spitzee, 60; Jumbo, 300; Cliff, 150; Velvet-Portland (milled), 250; I X L (milled), 100. Total for week, 6,390 tons; year to date, 231,368 tons.

COLOMBIA.

ANTIOQUIA.

(*From Our Special Correspondent.*)

Santa Margarita Gold Mining Co.—The five placer mines controlled by this company lie within six leagues of the village of Zaragoza in the Nechi valley. They are the Santa Margarita, Santa Barbara, San Pedro, Quiebra and Cordivo. The Santa Margarita is reported to be a rich property; work on a reservoir and ditches to supply a monitor has been in progress for over two years, but a crew of but seven men was all the labor at work most of last winter. At the other mines little or nothing is being done. Other syndicates besides the Santa Maganta Barbara Gold Mining Co. have Santa Margarita Barbara Gold Mining Co. have pany has a launch for navigating the Nechi river. The manager, an American, lives at the Santa Barbara mine, four leagues from Zaragoza, and 10 leagues from the Santa Margarita mine.

MEXICO.

SONORA.

(*From Our Special Correspondent.*)

Indiana-Sonora.—Phelps, Dodge & Co., of New York, have secured a controlling interest in this property. It adjoins property of the Greene Consolidated Co. Experimental development work will at once begin on the property.

NEW ZEALAND.

The Mines Department reports the exports of gold for June and the half-year ending June 30 as follows, in ounces of bullion:

	1903.	1904.	Changes.
June	64,075	55,938	D. 8,137
Half-year	257,198	267,305	I. 10,107

The bullion reported for the six months this year was equal to 241,110 oz. fine gold, or $4,983,866. Exports of silver for the same periods were as follows, in ounces:

	1903.	1904.	Changes.
June	150,324	134,553	D. 15,771
Half-year	363,662	396,072	I. 32,410

The greater portion of the silver was obtained from the gold mines in the Ohinemuri county, in the Hauraki mining district.

MINING STOCKS.

(Full quotations on pages 415 and 416.)

New York. Sept. 7.

The intervention of a holiday on 'change from Friday, September 2, to Tuesday, September 6, for the purpose of celebrating Labor Day, has been reflected in an uninteresting stock market during the week. Speculators are absorbed in their usual professional tactics to take profits and lay plans for the fall campaign, hoping to override the apathy that usually prevails during the national election. So far, the attention given to the copper group has resulted in a higher range of prices. Amalgamated hovers around $58, and Anaconda about $20.

Some interest has been shown in Horn Silver, of Utah, and no less than 600 shares have recently been sold, at $1.65, which is an improvement. To some extent the strength in this stock has been initiated by the contract made for treating the enormous quantity of zinc tailings at the mine. It is officially estimated that there are fully 500,000 tons in reserve, which, it is believed, will yield a substantial profit by the Peck concentrating process.

Comparatively little is being done in the majority of the gold and silver shares. Match orders between brokers seem to constitute the larger part of the daily transactions. No improvement is expected until the Western markets revive.

Boston. Sept. 6.

(*From Our Special Correspondent.*)

While there has been considerable profit-taking in this market, the fact cannot be disputed that prices hold well and fresh buyers are constantly appearing. Such stocks as Osceola, Tamarack, Utah and Wolverine hold their advances, notwithstanding the fact that they are now selling at their highest prices. There has been profit-taking in stocks like Isle Royale, Atlantic and Allouez. These stocks were the first to move on the new strike in adjacent territory, but speculation has turned now to practically the whole list. The market in the United States met rather a free offering of stock, and the result is the stock broke from $22 to $20.62½, recovering to $21.25. It was learned to-day that the August net was $107,000, which is the best month the company ever had. July was disappointing, on account of smelter troubles, which have since been remedied, as attested to by the August showing.

Osceola is up $6.50 for the week to $78, following a $7 rise the previous week. This stock is being taken for investment, as it is known that the company has reduced its cost price to a low figure and with an increasing production. Tamarack is up $13 to $120. About the same condition of affairs applies to this as to Osceola. Wolverine is selling at its highest price on record, namely, $93. This compares with $88 a week ago. The increase in the dividend of this company to $4 semi-annually lends stability to the whole situation. Calumet is steady around $510. The company declared its sixth consecutive dividend of $10 last week. Utah Consolidated, which has been quiet of late, started in again to-day, touching $43.50, which is $1.50 above a week ago. Bingham Consolidated took a move to-day by rising $1.12½ to $28.12½. Mohawk has made a $1.75 advance to $46.25, while Centennial, which has been rather groggy, holds well at $28.75. Copper Range is up $1.25 for the week to $58.

A $1 assessment has been levied by the Wyandot Copper Co., payable October 15. The stock is quoted at $1. Allouez settled to $12 early last week on realizing, but recovered to $13.75. The second instalment of $1.50 on the Allouez $3 assessment is payable September 26. This will make $22.25 per share paid to date. Atlantic broke $1.37½ to $13, but has since recovered to $14.50. Old Dominion touched $16.50; Parrot, $25.50, and Quincy, $90. Shannon is firmer, touching $4.62½. The August production of the latter was 868,000 lb. of copper, against 996,000 lb. for July. Isle Royale touched $20.50, but yielded to $18.50 on persistent profit taking. Boston Consolidated touched $7.50 on reported buying from New York, and on advices of a rich strike Dominion Coal is up $10 to $62. There is a scarcity of the stock in this center, and any buying advances the stock easily.

Colorado Springs. Sept. 2.

(*From Our Special Correspondent.*)

The past week has been an active one on the local exchange, and the amount of trading has been above the average. Prices have remained firm, and in some instances have made a gain, with a greater number of stocks dealt in. The production of the Cripple Creek district for August reached a total of $1,790,620, with a tonnage of 61,940. This is considerably in excess of July, but is not up to what is expected in September, owing to a number of properties which have not figured much in the August production which are expected to add materially to the September production. The total production for the past eight months is $14,028,420, which is very satisfactory, considering the labor conditions which have existed during all this time.

Portland gained some during the week, closing to-day $1.60@$1.70. Elkton has advanced

from 6¾ to 6⅝c. El Paso closed at 94c. Gold Dollar gained ¼c., selling to-day for 6⅞c. Isabella sold for 21½c. per share.

Salt Lake City. Sept. 3.

(From Our Special Correspondent.)

During the month of August dividends were paid by Utah mines to the amount of $429,500. The United States Mining Co., which owns properties in Bingham and Tintic, reported with its initial payment of $200,000. The Silver King, of Park City, responded with its usual $100,000; the Daly-West with $72,000; the Mammoth of Tintic with $200,000; the Annie Laurie, of the Gold Mountain district, with $12.500; the Sacramento, of Mercur, with $5,000; the Uncle Sam Consolidated, of Tintic, with $5,000; the Salvator, of Tintic, with $2,000, and the Tetro, also of Tintic, with $3,000. The Grand Central, Utah and Century, which have been prominent in the dividend column during the past year, have withdrawn for the present, and the surplus funds are being used for development purposes.

Notwithstanding the mining camps of Utah are generally prosperous and the output of bullion, as the records will show, is steadily on the increase, stocks continue dull and inactive. However, the month of August closed with a somewhat larger volume of business transacted than July.

During the past week there was some activity displayed in the Tonopah stocks. A few shares of Silver King were brought out around $50, while some Daly-West changed hands around $12 and $13. Mammoth has held firm, but there were no buyers willing to pay what it is worth. The sales of the week were $21,762 in amount.

San Francisco. Sept. 1.

(From Our Special Correspondent.)

A little more business was done in Comstock shares early in the week, but matters fell off again towards the close. There was quite a spurt in Best & Belcher, which ran up to $1.60, but dropped back again 20 cents.

Some quotations noted are: Ophir, $2.55; Best & Belcher, $1.40; Consolidated California & Virginia, $1.15; Mexican, 90c.; Exchequer, 71c.; Silver Hill, 52c.; Gould & Curry, 25c.; Scorpion, 8c. per share.

On the San Francisco & Tonopah exchange business was confined to a few stocks and was generally rather quiet. Montana Tonopah sold at $2.25; Tonopah Midway, 41c.; Red Top, 18c.; Rescue, 11c. per share.

On the California exchange sales of oil stocks were rather light. Buyers seem to lack interest in the market. Home sold at $1.35; Esperanza, 75c.; Independence, 30c.; Occidental, 5c. per share.

Monterey. Aug. 31.

(From Our Special Correspondent.)

Exchange on New York has been quiet, varying between 215 and 215.5, and closing Saturday at the latter figure.

Mining stocks have brought the following prices: In El Oro, Victoria, $33; Aldebaran, $52; Dos Estrellas, down to $1,910; Nacional, $10; Septentrion, $26; in San Luis Potosi, Barreno, $83; La Paz, of Matehuala, $200, and in Pachuca, San Francisco, $96, and Santa Gertrudis, $78.

COAL TRADE REVIEW.

NEW YORK, Sept. 7.

ANTHRACITE.

The anthracite trade is naturally quiet. There was a slight spurt in buying at some points during the last ten days of August, due to the desire to profit by the 10c. discount, but since September 1 the wholesale market has been dull in all consuming territories. Coal is of course going forward from the mines, but dealers are more or less indifferent, and in no territory does there seem to be a prospect of an immediate revival of interest. Dealers, however, expect an increase in retail buying now that householders are again returning to the cities from summer outings, but it is not expected that there will be any great increase in retail buying until the weather is colder. In short, September is bound to be a quiet month in the trade.

The various producing companies continue to hold down their outputs. The Reading and the Central collieries have been closed for a week; all companies shut down for Labor Day, and the Delaware & Hudson closed its mines on Tuesday as well. Each company pursues its own policy of restriction, most of them apparently preferring to close certain collieries and keep others running, rather than to close all for a week or so. Production for September will undoubtedly show a decline from August, the estimate for August being 4,500,000 tons.

Trade in the northwest is quiet. Arrivals at docks at the head of the lakes have been heavy, causing delays in unloading. The movement from the docks to inland points is not brisk. In Chicago territory also a lot of coal is arriving by lake, receipts at Milwaukee in July having been exceptionally heavy. Receipts at Chicago by lake to September 1 were 398,000 tons compared with 580,000 tons for the same period last year. The falling off this year is due to the delay in starting shipments on account of the late spring, the strike of the vessel masters, and the urgent demand for coal in the spring of 1903. Retail trade in Chicago territory is quiet; it is said that householders generally have not bought anything like as much coal to September 1 as in the corresponding period of last year. Along the lower lakes and in Canadian territory trade is quiet. A good fall demand is expected when the weather gets colder. Along the Atlantic seaboard there is little change. Dealers at some of the shoal water ports are laying in winter supplies, and retail buying is already showing signs of improvement. At Boston, New York and Philadelphia, however, wholesale trade will probably be quiet through this month. Demand for the small sizes is not expected to improve till steam-heating plants in hotels, office buildings and apartment houses go in commission again. In the meantime these sizes can be had from independent operators for less than the quotations of the large companies.

BITUMINOUS.

The Atlantic seaboard bituminous trade shows improvement in spots. Certain consumers seem to be increasing their orders for coal, while others are quiet, ordering little if at all.

In the far East trade is dull, and orders are scarce and hard to get. Along Long Island sound there is improvement in the demand at some points, while at others orders are no more plentiful than they have been. The shoal water ports are generally taking larger quotas of coal than the deep water ports. In New York harbor territory the market is generally quiet, with prices unchanged, fair grades of Clearfield selling for $2.40@$2.50, f. o. b. New York harbor shipping port. From these figures prices range up and down according to grade, but $2.25 seems to be about the minimum.

Transportation from the mines to tidewater is excellent. Car supply at the mines is up to all demands of producers. In the coastwise vessel market vessels are scarcer at some ports than at others. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 60c.; Boston, Salem and Portland, 75@80c.; Portsmouth and Bath, 80c.; Newburyport, 85c.; Lynn, 85@90c.; Saco, 90c. and towages. From New York harbor, the rates are 50@55c. to around Cape Cod.

Birmingham. Sept. 5.

(From Our Special Correspondent.)

Upon application by coal mine operators in this State, Judge T. G. Jones, of the United States Court, has issued injunctions against leaders of the United Mine Workers of America in Alabama, preventing them from interfering with laboring men offered work in the mines or being brought into the district from other States to take up work in the coal mines, where there is a strike on. The operators have been complaining that just as soon as they bring men in to mine coal, the union men, through threats and pleadings, interfere in the operation of the mines. The mines of the furnace operators are beginning to show increased production with non-union men. While some of the furnace men are offering union prices, they will not recognize the union. The leaders of the miners allege that they are law-abiding and say that the strike shall be kept up to the finish. The Tennessee Coal, Iron & Railroad Co. is making preparations to start up two or three mines during the present week, four or five being already in full operation. The Sloss-Sheffield Steel & Iron Co., the Republic Iron & Steel Co. and the Lacey-Buek Co. are bringing in a large number of hands from the Middlesboro (Ky.) district to take the places of striking miners, but the union men have succeeded in getting a majority of those brought in so far to quit work. The injunctions granted by the United States courts will probably put a stop to the interference.

With but one exception, every commercial coal operator in the State has signed the union wage contract, and the coal production for Alabama, including the coal mined by the non-union mines and convict mines, is large. State Mine Inspector Gray states that it is surprising to watch the coal production in this State, in the face of a strike being conducted so hard. There is a good demand for the product, with intimation of an advance in prices in the near future. It is learned that some of the operators whose mines are in full operation have contracts which will keep them busy for several months.

Chicago. Sept. 5.

(From Our Special Correspondent.)

Despite the fact that last week saw the close of the last month for the application of the graduated system of discount on anthracite, the trade of wholesalers continued dull, and since the coming of September it has become no better. Both wholesaler and retailer stick to the explanation that the consumer is unwilling to spend money for coal until he actually needs fuel, a feeling which is attributed to the long and hard winter of a few months ago. The leading agents for anthracite are preparing for a rush of orders as soon as cold weather shall actually set in, and express doubts over the ability of the railroads to handle the business without the trouble of a year or two ago. One thing seems to be shown in the present condition of things: The graduated system of discounts is not working so well now as it has worked previously. To the consumer with business sense a saving of 50c. a ton would seem to be a strong inducement to buy early. But he will not buy early. There has been a little better demand for anthracite in the last week in the west and northwest, however, which may prophesy the beginning of activity in Chicago territory generally. Collections are reported unusually difficult by many wholesalers.

The bituminous market continues weak in all steam coals, but the comparatively unimportant market for domestic sizes is growing stronger. Eastern and western grades of bituminous are too plentiful for the demand, though shipments from the mines are, generally speaking, better managed than for many months, being in general well regulated to the market. Quotations are but slightly changed. Illinois and Indiana lump brings $1.70@$2.50; run of mine, $1.30@$1.50; screenings, 90c.@$1.65. Hocking is in better and satisfactory supply, with the price holding at $3. Smokeless is in better condition, though the demand is not heavy yet, through the restriction of shipments; smokeless is quoted at $2.90@$3.15 for run-of-mine. Youghiogheny is a light seller at $3. To all appearances the prepared sizes of bituminous, both eastern and western, will be in good demand for the coming winter.

Cleveland. Sept. 6.

(From Our Special Correspondent.)

The coal situation in this territory has not changed. The market, in fact, has struck a dead level, from which only radical changes in the general industrial situation will lift it. Prices have hardly moved either way in weeks, and there is no immediate prospect of a change. The steam coal market in this territory has been about on a dead level. Pennsylvania and Ohio coals are hanging around 90@95c. at the mines. Slack is selling now about 20@25c. at the mines, with some talk of contracting on

rather a low basis. The season is getting pretty late, however, for any general contracts. The lake coal conditions have not changed and the market holds pretty quiet.

The coke situation is also easy and dull. Prices have stiffened a little and hold steady at $2 for the best grades of foundry coke and $1.50 for furnace coke.

Pittsburg. Sept. 6.

(From Our Special Correspondent.)

Coal.—The outlook for the coal trade in this district is very encouraging. All the mines are in operation, and shipments to the lake ports are being continued without interruption. The Pittsburg Coal Co. has just booked an order for 100,000 tons of coal from Coxe Brothers & Co., anthracite operators, with headquarters in New York. It is for delivery to lake points. The Pittsburg Coal Co. broke all previous records for production in August, the official figures showing that the month's operations was close to 1,500,000 tons. Prices remain firm, run-of-mine still being quoted at $1@$1.10 a ton at the mine.

Connellsville Coke.—The coke market is active and production and shipments show considerable gains over previous weeks. Prices are firmer than a week ago, but furnace coke continues to be quoted at $1.50 and foundry at $1.85@$2. The production in the Connellsville region last week was 163,698 tons, and the shipments amounted to 9,544 cars distributed as follows: To Pittsburg and river points, 3,493 cars; to points west of Pittsburg, 4,637 cars; to points east of Everson, 1,414 cars.

San Francisco. Sept. 1.

(From Our Special Correspondent.)

The market continues steady. Some descriptions of Australian coal are rather scarce. Lower prices for fuel oil are promised, which will not help coal.

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite, $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is nominal at $14 for Pennsylvania anthracite and $13 for Cumberland. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite, $8.50 for cannel and $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. Sept. 7.

The contract for furnishing the United States Army transports with coal, at Nagasaki, Japan, for the fiscal year ending June 30, 1905, has been let to the Mitsui Bussan Kaisha. This company is to furnish coal from its Miike mine at 3 yen per ton, equal to about $1.50. Miike coal is considered a good steam coal.

Imports of coal into the United States for the seven months ending July 31 are reported by the Bureau of Statistics as follows:

	1903.	1904.	Changes.
Canada	1,040,067	716,356 D.	323,711
Mexico	5	221 I.	216
Great Britian	1,220,506	52,969 D.	1,167,537
Other Europe	381	50 D.	331
Australia	169,012	122,855 D.	46,157
Japan	28,879	33,722 I.	4,843
Other countries	1,019	756 D.	253
Totals	2,459,869	926,929 D.	1,533,930

Of the imports this year 23,532 tons were classed as anthracite, the rest being bituminous coal. Imports were chiefly on the Pacific Coast this year, the business in the East, resulting from the anthracite strike, having swelled last year's receipts.

Coal production in the Nord and the Pas-de-Calais, the two important districts of France, for the half-year ending June 30, is reported as follows, in metric tons:

	1903.	1904.	Changes.
Nord	8,186,352	8,584,606 D.	101,746
Pas-de-Calais	3,101,543	3,138,534 I.	36,991
Total coal mined	11,287,895	11,223,140 D.	64,755
Coke made	763,436	762,246 D.	1,190
Briquettes made	428,257	455,610 I.	27,353

There were 48 collieries at work in the Nord during the half-year, and 82 in the Pas-de-Calais.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of August 27 that the coal market remains dull and stagnant. Smalls continue scarce. Quotations are: Best Welsh steam coal, $3.60; seconds, $3.54; thirds, $3.30; dry coals, $3.42; best Monmouthshire, $3.30; seconds, $3.24; best small steam coal, $2.16; seconds, $2.04; other sorts, $1.92.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½% discount.

The outward freight market is exceedingly quiet. Rates are unaltered. Some rates quoted from Cardiff are: Marseilles, $1.20; Genoa, $1.08; Naples, $1.08; Las Palmas, $1.32; St. Vincent $1.44; Rio, $2.04; Santos, $2.46; Buenos Aires $1.74.

IRON TRADE REVIEW.

New York, Sept. 7.

The iron market is still in an unsettled condition. Something will probably be determined at the pool meetings which are being held in New York this week, but no definite statement has yet been given out up to the time of writing. General anticipation, however, is that there will be heavy cuts authorized on structural material and on plates. The United States Steel Corporation seems to have changed its policy, and, if reports are to be credited, it is now the corporation which wants reductions, and the independents who are resisting them.

In this state of uncertainty it is not to be expected that there should be any considerable buying. Every one is naturally waiting to see which way prices are going. There is an expectation of better business, however, and some mills and furnaces are starting up. On the other hand, those furnaces which have been buying little or no ore this season are still holding back, and some sales which were expected or under negotiation have been postponed.

In all the pool meetings and discussions nothing is heard about rails. Business for this year promises to be light, as the railroads have bought nothing which they were not obliged to take, and the pool shows no disposition to give way.

Upon the whole, the iron market is in an unsettled and uncertain condition. It is probable, however, that next week will show some change, depending largely upon the result of the pool meetings above referred to.

Birmingham. Sept. 5.

(From Our Special Correspondent.)

There is a fairly good demand for pig iron in this section and prices remain firm. The production is still somewhat short of what it has been at times this year, and this week two other furnaces are reported out of service, one of the plants to be repaired and enlarged. The sales during the past week aggregated better than the week before, and the indications point to a better demand right along.

The Tutweiler Coal, Iron & Railway Co. blew out its Vanderbilt furnace on Saturday, and a new blowing engine is being placed, the old one is being repaired, and the furnace will be enlarged and relined. It is intended to make a 150-ton furnace out of the plant. Oxmoor furnace had to be banked on account of the coal shortage.

The coal miners' strike is having its effect on the iron production, though the operators claim that they are getting all the coal they need here, while coke is still being imported in quantities.

The order books of the iron companies in this State are filled for a few weeks, and inquiries are being received right along. The Alabama Consolidated Coal & Iron Co. has three furnaces in blast, two at Ironaton and one at Gadsden, and sales are averaging well. This is the only furnace company in the State signing the miners' union contract. The Republic Iron & Steel Co. has offered to pay the wages demanded by the union, but will not recognize the union.

The following pig iron quotations are given: No. 1 foundry, $10; No. 2 foundry, $9.50; No. 3 foundry, $9; No. 4 foundry, $8.25@$8.50; gray forge, $8@$8.50; No. 1 soft, $10; No. 2 soft, $9.50.

Chicago. Sept. 5.

(From Our Special Correspondent.)

There has been no noteworthy change in the market for pig iron in the last week. Sales have perhaps shown a tendency to revert to the practise of six months to a year ago—that of ordering small lots for quick delivery—but it is worthy of consideration that the large orders of a year are apt to be bunched, leaving the smaller sales to fill the gaps between big transactions. Neither buyers nor sellers show any eagerness to extend contracts generally into the year 1905, with the conditions of production so uncertain as they now promise to be, and the general business of the country subject to possible change in the event of a surprise in the coming election. It is asserted by sellers that prices are so low that they do not wish to contract ahead generally. But the chief reason for small lots doubtless is the condition of the business of foundrymen and manufacturers. This business has not improved enough to warrant continuance of the brisk buying of two or three weeks ago. A slow, steady advance is prophesied by the most hopeful students of local conditions.

Prices remain as last week—$9.50@$9.75, Birmingham, or $13.15@$13.40, Chicago, for Southern, and $13.50@$14 for Northern. Northern holds especially firm; buyers seem to be of the opinion that Southern will weaken soon. Coke is not lively, but there is no surplus coming forward, and the price remains firm, at $4.65@$4.75, as last week.

Cleveland. Sept. 6.

(From Our Special Correspondent.)

Finished Material.—The market has been quiet and waiting. The only indication of the ending of the difficulty over prices was the sale of two lots of structural steel amounting to about 6,000 tons. There was also some buying of smaller lots, but it was said that this was under a guarantee that the prices should not decline. The market held remarkably steady, however, fears of cuts having been disposed of to a certain extent. There is still some uncertainty as to plates, but the smaller mills are out of the market, from one cause or another, and the larger mills are firm.

The sheet situation has been a little stronger than it was, but it is evident that this is merely the shifting of the orders from the smaller to the larger mills, the former having about all the business they can care for at present. This has left prices unchanged. The bar situation is still weak, some of the smaller mills having continued to cut prices, forcing the larger mills to meet the conditions. The market is stable at 1.20c.@1.25c. Some of the mills are trying to hold for 1.30c. at the mill, but have not been able to do so. The billet situation is quiet, and rails are dull.

Iron Ore.—There has been only light buying. It has seemed imperative that some of the buyers should cover their needs, not having done so before. This has kept hope always ahead of good buying. It does not seem now that this can be the case. The market, in fact, seems to have seen the greater part of its activity for this year. Prices hold about as they have been. The rates of carriage also have remained stable. The prices are $3.25 for bessemer old range; $3 for bessemer Mesabi; $2.60@$2.75 for non-bessemer old range and $2.40@$2.50 for non-bessemer Mesabi. The rates of carriage are unchanged at 65c. from Duluth; 60c. from Marquette and 50c. from Escanaba.

Pig Iron.—The buying of pig iron has continued light. Neither side of the market seems inclined very much to urge things. The furnaces are well supplied with orders—as far as the active concerns go—and are not ready to increase their output until the buyers get ready. The latter are held off by the advance in prices and by the waiting attitude in the steel trade. The bessemer situation has not changed, being only moderately active. Basic is dead. Prices mean little in either of these trades. There is a fair call for malleable. The efforts to advance prices have not met with any glowing success. The market does not seem to be ready for any material advance.

New York. Sept. 7.

Pig Iron.—Small orders and little activity characterize the market. For northern iron we quote: No. 1X foundry, $14.50@$15; No. 2X, $14; forge, $13@$13.25. For Southern iron on dock prices are about as follows: No. 1 foundry, $13.50@$13.75; No. 2 foundry, $13@$13.25; No. 3 foundry, $12.75@$13; forge, $12.25@$12.50; No. 1 soft, $13.50@$13.75; No. 2 soft, $13@$13.25.

Bar Iron and Steel.—The market continues quiet. Refined bars are quoted at 1.455@1.495c., in large lots, with steel at the higher figures. Common iron bars can be had for 1.35 c. per pound.

Plate.—Demand has been light. Prices are cut $4 per ton. We quote 1.545c. for ¼-in. tank plate in carloads at tidewater, with other grades in proportion.

Steel Rails.—Quotations remain $28 for standard sections, f.o.b. mills. We quote light rails f.o.b. eastern Pennsylvania mills, as follows: 12-lb., $27; 20-lb., 25-lb., 30-lb., and 35-lb., $25; 40-lb. and 45-lb., $24.

Structural Material.—The market has been quiet. Prices are cut $4 per ton. We quote on large lots at tidewater, 1.55@1.80c. for beams, angles and channels.

Pittsburg. Sept. 6.

(*From Our Special Correspondent.*)

The meetings of leading steel interests in New York last week and the adjournment until to-day has caused many conflicting reports as to the situation. Information given out in Pittsburg is entirely different from statements reported to have been made in New York. As representatives of independent interests are talking here, it is evident that, contrary to its usual policy, the United States Steel Corporation is advocating reductions in some lines of finished steel products. Independents are urging the continuation of present prices, and it was announced that at the meetings of the beam and plate pools last week prices had been re-affirmed, and that the meetings this week are merely to complete some details which the Lackawanna Steel Co. insists upon before it agrees to become a member of the various steel associations. It was reported here that the Lackawanna was already a member of the billet, plate and beam pools. All the stories told within the past two weeks that the company had taken a number of orders for structural material at cut rates are denied. The cut in wire prices, it is explained, was not the beginning of a series of reductions in other lines, but was done to carry out a threat. Conditions were seriously disturbed by this action, and manufacturers say that any further cutting will do a great deal of harm in delaying buying. The effect has been particularly noticed in steel bars. Usually the agricultural implement manufacturers place their contracts at this time for deliveries extending throughout the year, and it is not unusual to have orders on the books by September 1 for from 150,000 to 200,000 tons of steel bars. All this business has been held back, as there is no immediate necessity for making contracts before fall. Other contracts that had been counted on have been sidetracked presumably by the report of probable reductions all along the line. It is not admitted by any steel men outside of the Corporation that plates or structural material are to be reduced, and a prominent representative of the leading interest declared that there would not likely be any further changes in price. The report sent out from New York a few days ago that merchant steel pipe had been cut $4 or $5 a ton was denied at headquarters of the company here. On the first of the month a re-classification was announced which had been in preparation long before the wire cut was announced, and was not in any way influenced by that action. It was officially stated that the changes made by the new classification do not affect prices very materially, but make a cut that will average about $1 a ton. Despite the fact that the steel market has been quiet, pending a definite adjustment of prices, there is an increased activity at the mills in the Pittsburg and surrounding districts. This is due partly to the many orders received lately for steel cars which has resulted in specifications for plates. The Pressed Steel Car Co. has a contract with the Carnegie Steel Co. for plates on a sliding basis, and the Homestead works are now turning out about 10,000 tons a month for the first time in a long period. The big plant is in full operation in all departments except one mill, which is expected to go on this week. The company is still operating two of its steel hoop plants in the Youngstown district, despite the efforts of the Amalgamated Association of Iron, Steel & Tin Workers to keep them closed. An effort was made during the week to arrange another conference, but the company declined to make any change in its policy, and will run the works on an open basis at the terms offered at the last conference. Satisfactory progress is being made in getting new men to take the places of the Amalgamated men, who refuse to work unless the association scale is signed. A settlement has not yet been reached on the wage scale at the conference being held in Chicago between representatives of the Amalgamated Association and the Republic Iron and Steel Co. The two members of the board of conciliation have not agreed on a third man, and in order, evidently, to hasten a decision the company has ordered all of its plants to close.

Late this afternoon the sentiment regarding the probable action to be taken at the meetings of the structural and plate pools in session in New York to-day seemed to change. The representative of a leading interest admitted that a reduction in prices may be agreed upon. "If a cut is made," he said, "structural material will be dropped from 1.60c. to 1.40c. and plates from 1.60c. to about 1.35c. If these reductions are ordered billets will be reduced $4 or $5 a ton, and sheet and tin-plate bars also will be cut, and an open market will determine the prices of sheets and tin-plate. I have no positive assurances that a reduction will be ordered, but am inclined to believe that the United States Steel Corporation will be able to enforce its plans for reductions all along the line."

Pig Iron.—The market has been very quiet during the past few days, and only a few small sales have been recorded, but it is given out that prices are firm and likely to continue for some time. Last week some sales of 1,000 and 2,000-ton lots of bessemer pig iron were made at prices ranging from $11.65 to $11.85, Valley furnace, but to-day it is announced that bessemer is being held firmly at $12, Valley. Foundry No. 2 is quoted at $12.65@$12.85, Pittsburg, and gray forge at $11.85@$12, Pittsburg.

Steel.—There is no business in bessemer or open-hearth billets, and it is not known, therefore, that less than the pool price of $23 can be done. Quotations of all finished lines remain unchanged, but new prices may be announced at the close of the pool meetings in New York. Steel bars are still quoted at 1.35c. and plates at 1.60c.

Sheets.—There seems to be less shading of prices this week, and 2.10c. is the minimum price for black sheets, No. 28 gauge. Galvanized sheets remain at 3.10c.@3.15c.

Ferro-Manganese.—The leading producer continues to quote 80% domestic at $41.50 per ton.

Cartagena, Spain. Aug. 20.

(*Special Report of Barrington & Holt.*)

Iron and Manganiferous Ores.—No shipments are reported for the week. The market for ores is very dull. Freights are higher, 6s. 8d. having been paid to Middlesboro.

Quotations for iron ore are: Ordinary 50% ore, 6s.@6s. 3d.; special low phosphorus, 6s. 6d.@7s. 3d.; specular ore, 58%, 8s. 6d.; magnetic ore, 60%, 10s. 9d. for lumps, 9s. for smalls. Manganiferous ores range from 9s. 3d. for 12% manganese and 35% iron, up to 14s. for 20% manganese and 20% iron.

Pyrite.—Iron pyrite, 40% iron and 43% sulphur, is quoted at 10s. per ton.

CHEMICALS AND MINERALS.

New York, Sept. 7.

With vacations about at an end, the market shows signs of a revival, and, judging from the inquiries in hand, a better tone in prices is already manifest. Of course, the unsettled condition of domestic barytes—the result of "baying" by the combination to induce an independent producer to sign the agreement—has had some effect on the mineral market. It seems likely, however, that this competition will be of short duration.

Cyanide.—Trade continues quiet, at 18@19c. per pound.

Bleaching Powder.—As yet next year's prices for domestic delivery have not been fixed. Importers are not inclined to give their views, but reports from abroad state that the 1905 schedule will be higher. In fact, business has already been done abroad at an advance of 10s. per ton. At New York prime brands are still quoted at $1.20@$1.25 per 100 pounds.

Copper Sulphate.—In some quarters firmer prices are talked of, but at present makers quote $4.25@$4.50 per 100 pounds. Imports are still being made, chiefly at Philadelphia.

Acids.—There is an undercurrent of strength, which indicates higher prices for nitric and a few other acids. Raw materials generally are high, and not likely to recede in value so long as combinations are in control.

We quote as below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, com'l	$5.00@$5.25
Muriatic, 20°	1.60	Sulphuric, 50°	
Muriatic, 22°	1.75	bulk, ton	13.50@14.50
Nitric, 36°	4.50	Sulphuric, 60°	1.05
Nitric, 38°	4.75	bulk, ton	18.00@20.00
Nitric, 40°	5.00	Sulphuric, 66°	1.20
Nitric, 42°	5.50	bulk, ton	21.00@23.00

Brimstone.—Sales are few, though quotations remain at $21.50 for shipments of best unmixed seconds. For thirds, 50c. less is asked.

Pyrite.—Inquiries are somewhat better, and prices continue at 9@10c. per unit for fines, and 10@12c. for lump, f.o.b. Atlantic ports. Imported ore carries from 46@52% sulphur, American from 42@44 per cent.

Nitrate of Soda.—The market is gradually becoming stronger, and reports from Chile intimate that producers are planning for higher prices. For 95%, quotations at New York are $2.15@$2.17½ per 100 lb. for spot and nearby; futures are $2.20@$2.225. For 96%, about 2½c. per 100 lb. more is asked.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, Sept. 1, gives the following interesting statistics, in long tons:

	1903.	1904.
Imports to Atlantic ports from Jan. 1, 1904, to date	137,301	161,964
Stock in store and afloat Sept. 1, 1903, in New York	.....	200
Stock in store and afloat Sept. 1, 1904, in Philadelphia	2,000	300
To arrive, due Dec. 15, 1904	80,500	81,500
Visible supply to Dec. 15, 1904	82,500	82,000
Stock on hand Jan. 1	7,800	8,100
Deliveries past month	12,575	25,600
Deliveries since Jan. 1	143,101	169,564
Total yearly deliveries	229,589	.....
Prices, Sept. 1	2.10c	2.17½c

Quotations are for 96%; 95% can be had at from 2½c. to 5c. per 100 lb. cheaper. Deliveries so far this year show an increase of 26,463 tons, or 19 per cent.

Chilean Nitrate of Soda Market.—Messrs. Jackson Bros., of Valparaiso, write under date of July 23 that an excited market aided by speculation have driven prices to a point not seen for many years past. The demand throughout the fortnight has been centered in deliveries for the whole of 1905, and even as far as March, 1906, and the advance in quotations obtained has reflected to a smaller degree on the nearer shipments of this year, for which, comparatively speaking, there has scarcely been any inquiry. The market opened with a resale of April-December, 1905, monthly parcels, at 6s. 10½d., and for which 6s. 11½d., 7s., 7s. 1½d., and 7s. 2d. were afterwards successively paid; January to March, 1905, advancing from 7s. 3d. to 7s. 6d., while August to October of this year has with difficulty risen from 7s. 6d. to 7s. 8d. alongside. Transactions amount to almost 2,000,000 qtls. The market closes quiet, with some anxiety shown by speculators to resell, although producers in general are very confident of the future of the article and even look forward to

8s. We quote 95% August-October, 7s. 8d.; November-December, 7s. 7½d.; January-March, 7s. 6d.; and 96% August-December, 7s. 9d., all alongside. The price of 7s. 8d. alongside, with an all-round freight of 16s. 3d., stands in 9s. 4d. per cwt. net cost and freight, without purchasing commission.

Sulphate of Ammonia.—Good gas liquor can be had at $2.975@$3 per 100 lb., at either New York or Baltimore.

Phosphates.—New orders are comparatively few for export, while domestic trade remains quiet. Prices generally tend upward.

Abroad, miners are busy, especially in Algeria and Tunis they are making a heavy output. From Bone, exports in July were 31,570 metric tons, making a total of 191,337 tons for the seven months, principally to France, Germany, Great Britain and Italy. Compared with the corresponding seven months last year, there is an increase of 24,054 tons, or 14.4 per cent.

Phosphates are quoted as follows, per ton:

Phosphates.	F. o. b.	C. i. f. Gt. Britain or Europe.
*Fla., hard rock, 77@80%	$7.25@$7.50	$10.86@11.85
land pebble, 68@73%.	3.75@ 4.00	7.70@ 8.40
†Tenn., 78@80%	4.00@ 4.25	10.27@10.67
78%	3.75@ 4.00	.....
75%	3.25@ 3.50	.....
‡So. Car. land rock	3.25@ 3.50	.....
river rock, 55@60%	3.00@ 3.25	6.33@ 6.56
Algerian, 63@70%	....	6.93@ 7.59
58@63%	....	6.15@ 6.60
53@58%	....	5.05@ 5.20
Tunis (Gafsa)	....	6.33@ 6.50
Christmas Isle, 80@85%	....	13.20@14.03
Ocean Isle, 82@88%	....	13.60@14.45
Somme, Fr., 70@75%	....	10.63@11.02
Bordeaux, Fr., 60@65%	....	7.60@ 7.72
55@60%	....	6.44@ 6.55
Liege, Bel., 60@65%	....	7.00@ 7.10

*F. o. b. Florida or Georgia ports. †F. o. b. Mt. Pleasant. ‡On vessel, Ashley River, S. C.

Liverpool. Aug. 30.

(*Special Report of Joseph P. Brunner & Co.*)

We have still to report a quiet market for chemicals as regards export business, but deliveries for home trade are fairly good.

Soda ash is firm. For tierces, nearest range is about as follows: Leblanc ash, 48%, £5@£5 10s.; 58%, £5 10s.@£6 per ton, net, cash. Ammonia ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s. Bags, 5s. per ton less. Soda crystals are in good jobbing demand, at generally £3 7s. 6d. per ton, less 5% for barrels, or 7% less for bags, with special terms for a few favored markets. Caustic soda is quiet, as follows: 60%, £8 15s.; 70%, £9 15s.; 74%, £10 5s.; 76%, £10 10s. per ton, net, cash. Special quotations for the Continent and a few other export quarters.

Bleaching powder is quoted at £4 15s.@£5 per ton, net, cash, for hardwood packages, as to destination. There is not much going on for prompt delivery, but for home trade consumption over 1905 contracts are being placed pretty freely.

Chlorate of potash is still held for 3@3¼d. per lb., net, cash, as to quantity and market.

Bicarbonate of soda is selling at £6 15s. per ton, less 2½% for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of ammonia is again a shade dearer, at £12 2s. 6d.@£12 5s. per ton, less 2½% for good gray 24@25% in double bags, f.o.b. here.

Nitrate of soda is in moderate request on spot at £10 5s.@£10 10s. per ton, less 2½% for double bags, f. o. b. here, as to quality.

METAL MARKET.

New York, Sept. 7.

Gold and Silver Exports and Imports

At all United States Ports in July and Year.

Metal	July		Year	
	1903.	1904.	1903.	1904.
Gold				
Exports	$9,117,758	$1,083,749	$40,453,999	$69,532,642
Imports	4,631,207	8,925,418	18,607,261	56,689,144
Excess	E. $4,486,551	I. $7,842,169	E. 21,846,738	E $12,843,498
Silver:				
Exports	3,015,426	4,534,514	20,520,765	30,902,213
Imports	2,564,217	1,381,017	12,545,511	15,156,617
Excess	E. $451,209	E. 3,153,497	E. $7,975,254	E $15,745,596

These exports and imports cover the totals at all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending September 3 and for years from January 1st.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports
Week	$1,606,135	$29,930	$543,445	$5,051
1904	71,907,714	3,795,896	26,915,457	635,963
1903	32,194,707	3,718,375	13,853,255	1,689,717
1902	24,513,808	1,658,762	16 951,505	825,694

Gold exports were chiefly to France; silver, to London. Imports were principally from Central America and the West Indies.

Business generally continues quiet, although the speculative markets show an improvement. No gold has gone to Europe yet, contrary to expectation; but there have been considerable shipments to Argentina, chiefly on London account. Little gold is coming from Australia now, but we continue to receive a considerable amount from Japan.

The statement of the New York banks—including the 56 banks represented in the Clearing Houses—for the week ending September 3, gives the following totals, comparisons being made with the corresponding week of 1903:

	1903.	1904.
Loans and discounts	$924,415,800	$1,117,242,600
Deposits	918,131,300	1,217,084,000
Circulation	43,871,400	38,980,700
Specie	172,736,000	271,264,900
Legal tenders	74,093,800	80,509,500
Total reserve	$246,829,800	$351,774,400
Legal requirements	229,532,825	304,271,000
Balance surplus	$17,296,975	$47,503,400

Changes for the week this year were increases of $18,185,400 in loans and discounts, $9,781,200 in deposits, and $1,256,300 in circulation; decreases of $6,314,000 in specie, $1,112,700 in legal tender, and $9,872,000 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars, and comparison is made with the holdings at the corresponding date last year:

	1903.		1904.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'n.	$172,736,000	.....	$271,264,900	.....
England	177,505,870	.....	183,769,365	.....
France	508,803,170	$224,634,175	535,502,650	$223,900,695
Germany	172,805,000	60,715,000	179,490,000	63,065,000
Spain	73,160,000	101,240,000	73,875,000	102,660,000
Netherlands	19,712,500	32,455,000	27,406,000	32,092,000
Belgium	14,520,000	7,260,000	15,466,665	7,733,335
Italy	95,940,000	11,470,000	110,590,000	19,788,500
Russia	412,215,000	43,490,000	473,920,000	43,275,000
Austria	227,375,000	63,810,000	241,430,000	62,715,000

The returns of the Associated Banks of New York are of date September 3 and the others September 1, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Indian exchange was steady, Council bills offered in London bringing 16d. per rupee. A considerable amount of gold is still going from Australia to India. Silver shipments, however, have almost stopped for the present.

The silver market has been characterized this week by extreme dulness, with moderate decline in quotations.

The United States Office in New York reports receipts of 36,000 oz. of silver for the week.

Shipments of silver from London to the East for the year up to August 25 are reported by Messrs. Pixley & Abell's circular as follows:

	1903.	1904.	Changes
India	£3,950,975	£6,969,588 I.	£3,018,613
China	294,186	372,722 I.	78,536
Straits	696,879	58,103 D.	638,776
Total	£4,942,040	£7,400,413 I.	£2,458,373

Receipts for the week were £146,000 in bar silver from New York, £24,000 from Australia, and £5,000 from the West Indies; total, £175,000. Shipments were £138,000 in bar silver to India.

The movement of gold and silver in France for the seven months ending July 31 is reported as follows:

Gold.	1903.	1904.
Imports	Fr.242,607,000	Fr.524,862,000
Exports	42,787,000	53,718,000
Excess, imp.	199,820,000	471,144,000
Silver.		
Imports	67,188,000	61,483,000
Exports	36,785,000	74,091,000
Excess	I. 30,403,000	E. 12,658,000

Imports of copper and nickel coins, at their face value, were 74,000 fr. in 1903, and 81,000 fr. in 1904; exports were 346,000 fr. in 1903, and 238,000 fr. this year.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.45½	$0.47½
Peruvian soles and Chinese pesos	.41½	.43
Victoria sovereigns	4.86	4.87½
Twenty francs	3.87	3.90
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

September.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. Cathodes, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. Cts. per lb.	Spelter. New York, Cts. Per lb.	Spelter. St. Louis, Cts. per lb.
1	12⅜@12⅝	12¼@12⅜	12@12¼	57	27½	4.20	5.00	4.85
2	" 12⅜	" 12¼	" 12	57	27½	4.20	5.00	4.85
3	" 12⅜	" 12¼	" 12	....	27¾	4.20	5.00	4.85
5	.....	.....	.....	57½	.....	4.20	5.00	4.85
6	12⅜@12½	12¼@12½	12@12¼	57⅛	27½	4.20	5.00	4.85
7	" 12½	" 12½	" 12¼	57½@57¾	27¾	4.20	5.00	4.85

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars.

SILVER AND STERLING EXCHANGE.

September	Sterling Exchange.	Silver. New York. Cents.	Silver. London. Pence.	September	Sterling Exchange.	Silver. New York. Cents.	Silver. London. Pence.
1	4.87¾	57½	26⅝	5	.....	.....	26⅝
2	4.87½	57½	26⅝	6	4.87	56¾	26½
3	4.87½	57	26½	7	4.8710	56¾	26½

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver .925 fine.

Copper.—During the week under review, the market has again been active, and there is a strong undertone. Exports continue on a large scale. The closing quotations are given as 12⅜@12⅝ for Lake; 12¼@12½ for electrolytic copper in ingots, cakes and wirebars, 12@12¼ in cathodes; 12@12¼ for casting copper.

The market for standard copper in London, which closed last week at £57, opened on Monday at £57 7s. 6d., and the closing quotations on Wednesday are cabled as £57 5d.@£57 6s. 3d. for spot, £57 6s. 3d.@£57 7s. 6d. for three months.

Statistics for the second half of August show an increase in the visible supplies of 1,100 tons.

Refined and manufactured sorts we quote: English Tough, £59 15s.@£60; Best Selected, £60 15s.@£61; Strong Sheets, £69 10s.@£70; India Sheets, £67 10s.@£68; Yellow Metal, 6@6⅛d.

Exports of copper from New York and Baltimore for the week ending September 6 were 6,827 long tons, and $100 worth of matte, principally to Austria, Holland, France and Great Britain. Imports at New York for the week of September 2 were 92 tons copper and 2,942 tons ore.

Tin.—The market has displayed considerable strength. There has been some speculative buying in London, while the East is only a reluctant seller. The statistical position of the article is said to be very good, but consumers in this country proceed cautiously and are only covering their immediate requirements. The

closing quotations are given as 27½@27⅝ for spot and futures.

The foreign market, which closed last week at £124 5s., opened on Monday at £124, advanced on Tuesday to £125 15s., and the closing quotations on Wednesday are cabled as £125 17s. 6d.@£126 for spot, £126 7s. 6d.@£126 10s. for three months.

Lead has been quiet but steady without any special feature. The closing quotations are 4.20 New York, 4.12½ St. Louis.

The foreign market is easy, Spanish lead being quoted at £11 12s. 6d.@£11 13s. 9d., English lead £11 15s.@£11 16s. 2d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is strong and quiet. Both desilverized lead and Missouri brands are selling in a limited way at 4.12½c. Some special brands, however, are bringing 4.15@4.17½c., East St. Louis.

Spanish Lead Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of August 20, that the price of silver has been 14.75 reales per oz. Exchange is 34.82 pesetas to £1. Local quotation for pig lead has been 66.75 reales per quintal, which, on current exchange is equal to £10 14s. 7d. per long ton, f. o. b. Cartagena. Exports for the week were 249,064 kg. argentiferous to Coueron, France; 637,900 kg. argentiferous, 64,000 kg. desilverized lead and 672 kg. silver ingots to Marseilles.

Spelter.—The market continues to display considerable strength. We understand that shipments have already commenced on the export sale which we reported last week, as the metal is very urgently needed abroad. There has also been a good demand for home consumption. The closing quotations are given as 4.85 St. Louis, 5c. New York.

The foreign market is steady, good ordinaries being quoted at £22 12s. 6d.@£22 15s., specials at £22 15s.@£22 17s. 6d.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is rather unsettled. Latest sales are on a basis of about 4.92½c., East St. Louis.

Silesian Spelter Market.—According to a communication from Herr Paul Speier, of date August 26, the market for spelter has been firm, with a trend steadily upward. The improvement has been due primarily to the demand for export, particularly to Great Britain, but the domestic consumption has also been very large. The smelters are nearly sold out, so far as concerns their production during the summer months, and are asking for deliveries during the last quarter of the year, 22.25@22.50 marks for ordinary brands, and 22.75 marks for refined per 50 kg., f.o.b. cars at Stettin. These prices are equivalent to 4.80@4.86c. per lb. for ordinary and 4.91c. per lb. for refined spelter. The exports to Great Britain in July were 6,460 tons, making a total of 50,875 tons for the seven months of 1904, against 50,221 tons for the same period of 1903. The Silesian Association of Zinc Manufacturers has raised the price of sheet zinc one mark per 100 kg., making the present quotation 49.50 marks per 100 kg. for delivery at Morgenroth and Oberhausen. For zinc dust the inquiry has been very satisfactory. The present quotation is 42@42.50 marks per 100 kg. for lots of 10 tons or more, f.o.b. Stettin.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of August 20, that the demand for zinc ore continues strong. Prices remain at 67 pesetas per ton for blende, 35% zinc, and 47 pesetas for calamine, 30% zinc. Exports for the week were 363 tons blende to Swansea, and 3,335 tons to Antwerp.

Antimony is quiet and unchanged. We quote: Cookson's, 6⅞@7c.; Hallett's, 6½@6⅝c.; U. S., French, Japanese, Italian, Hungarian and Chinese, 6@6⅛ cents.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per pound.

Platinum.—Quotations are nominally $18.50 per ounce, but the tendency is upward, and higher prices are expected.

Platinum in manufactured forms is very firm. Messrs. Eimer & Amend, of New York, quote for different forms as follows: Heavy sheet and rod, 75c. per gram; foil and wire, 77c.; crucibles and dishes, 80c.; perforated ware, like cones, etc., 85c. per gram.

Quicksilver.—Prices are unchanged. In New York large lots have been offered at $43.50 per flask, with $44.50 quoted for smaller orders. The San Francisco price continues $43@$44 for domestic business, but as low as $41.50@$42 has been offered for export. The London price is £7 17s. 6d., with the same quotation from second hands.

Minor Metals and Alloys.—Thallium is quoted at 60@65 marks per kg. at Breslau, Germany. Manganese metal is quoted 360 marks per 100 kg., f. o. b. Bremen, Germany. Manganese tin alloy, 55%, is quoted 365 marks per 100 kg. for first quality and 225 marks for second quality, both f. o. b. Bremen.

For other minor metals and their alloys, wholesale prices, f.o.b. works, are as follows:

Aluminum.	Per lb.		Per lb.
No. 1.99% ingots	.33@37c.	Ferro-chrom. (74%)	.12½c.
No. 2.90% ingots	.31@34c.	Ferro-Tungsten (37%)	.45c.
Rolled Sheets	.4c. up	Magn'um, pure (N.Y.)	.60c.
Alum-bronze	.20@23c.	Manganese	.$2.75
Nickel-alum	.33@39c	Mangan'e Cp. (20% Mn)	32c.
Bismuth	.$2.10	M'ng'n'e Cp. (30% Mn)	.38c.
Chr'm'm, pure (N. Y.)	.80c.	Molybdenum (Best)	.$1.70
Copper, red oxide	.50c.	Phosphorus, foreign	.45c.
Fe.-Molybd'm (50%)	.$1.00	Phosphorus, American	.70c.
Ferro-Titanium (10%)	.90c.	Sodium metal	.50c.
Ferro-Titanium (20@25%) N. Y.	.55c.	Tungsten (Best)	.$1.25

Differences in price depend chiefly upon size and conditions of order.

Missouri Ore Market. Sept. 3.

(From Our Special Correspondent.)

The highest price reported paid for zinc ore was $40 per ton. The best grades of ore failed to bring as high a proportionate price as medium grades of ore. The best ores sold on an assay basis price of $37.50 and $38 per ton of 60% zinc, while some medium grade ores sold as high as $39 per ton of 60% zinc. As has been previously outlined in the JOURNAL, the output is insufficient to meet the demand of the increased smelting capacity drawing a supply from this district, and in consequence ore price has been about $4 per ton higher than the metal market for two months. The new smelters erected this summer expected to obtain all or a large part of their supply from Colorado, but for some reason or other they are depending upon this district for a full supply. This has raised the demand several hundred tons above this time last year, with no corresponding increase in the output. There could be but one result. Now that spelter has advanced, an advance of $1 per ton has been made on medium grade ores, which will likely be followed next week by a similar advance on high grade ores. Zinc ore producers look for spelter to continue upward to 6c., basing their opinion on the ore situation. Lead ore followed the advance on pig lead, closing the week at $53.50, $1.50 per ton higher.

Following are the shipments of zinc and lead from the various camps of the district for the week:

	Zinc lb.	Lead lb.	Value.
Joplin	2,696,590	270,100	$60,810
Webb City-Cartervl	2,474,160	378,440	54,510
Duenweg	853,050	235,850	21,450
Galena-Empire	900,660	88,390	17,220
Alba-Neck	777,580	8,980	15,010
Aurora	583,070	16,780	9,580
Zincite	383,420	9,810	7,140
Carthage	297,900	42,650	6,800
Badger	356,780	.....	6,180
Granby	388,000	55,000	5,800
Sherwood-Mitchell	188,450	19,320	4,280
Prosperity	108,080	73,890	4,010
Oronogo	105,810	6,710	1,980
Baxter	58,860	.....	1,020
Spurgeon-Spring C.	93,450	2,600	1,000
Beef Branch	79,030	17,440	980
Reeds	34,120	.....	620
Totals	10,379,010	1,215,960	$218,390
36 weeks	355,524,680	44,985,120	$7,135,990

Zinc value, the week, $185,970; 36 weeks, $5,910,150

Lead value, the week, $ 32,420; 36 weeks, 1,225,840

Average Prices of Metals per lb., New York.

Mo.	Tin.		Lead.		Spelter.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan.	28.33	28.845	4.075	4.347	4.865	4.863
Feb.	29.43	28.087	4.075	4.375	5.043	4.916
Mar.	30.15	28.317	4.442	4.475	5.349	5.057
April.	29.81	28.132	4.567	4.475	5.550	5.219
May.	29.51	27.718	4.325	4.423	5.639	5.031
June.	28.34	26.325	4.210	4.196	5.697	4.760
July.	27.68	26.573	4.075	4.192	5.662	4.873
Aug.	28.29	27.012	4.075	4.111	5.725	4.866
Sept.	26.77	.....	4.243	.....	5.686	.....
Oct.	25.92	.....	4.375	.....	5.510	.....
Nov.	25.42	.....	4.218	.....	5.038	.....
Dec.	27.41	.....	4.162	.....	4.731	.....
Year	28.09	.....	4.237	.....	5.400	.....

NOTE.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.; February, 4.717c.; March, 4.841c.; April, 5.038c.; May, 4.853c.; June, 4.596c.; July, 4.723c.; August, 4.716c.

Average Prices of Copper.

Mo.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan.	12.159	12.410	12.361	12.553	53.52	57.55
Feb.	12.778	12.063	12.901	12.245	57.34	56.57
Mar.	14.416	12.299	14.572	12.551	63.85	57.321
April.	14.454	12.923	14.642	13.120	61.72	58.247
May.	14.435	12.758	14.618	13.000	61.73	57.321
June.	13.942	12.269	14.212	12.399	57.30	56.398
July.	13.094	12.380	13.341	12.505	56.64	57.256
Aug.	12.962	12.343	13.159	12.468	58.44	56.952
Sept.	13.205	.....	13.345	.....	56.82	.....
Oct.	12.801	.....	12.954	.....	55.60	.....
Nov.	12.617	.....	12.813	.....	56.30	.....
Dec.	11.952	.....	12.084	.....	56.36	.....
Year	13.235	.....	13.417	.....	57.97	.....

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Mo.	1902.		1903.		1904.	
	London, Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents	London, Pence.	N. Y., Cents.
Jan.	25.62	55.53	21.98	47.57	26.423	57.055
Feb.	25.41	55.09	22.11	47.89	26.665	57.592
Mar.	25.00	54.23	22.49	48.72	26.164	56.741
April.	24.34	52.72	23.38	50.56	24.974	54.202
May.	23.71	51.31	24.89	54.11	25.578	55.430
June.	24.17	52.36	24.29	52.86	25.644	55.673
July.	24.38	52.88	24.86	53.92	26.760	58.095
Aug.	24.23	52.52	25.63	55.36	26,591	57,806
Sept.	23.88	51.52	26.75	58.00	.....	.....
Oct.	23.40	50.57	27 89	60.36	.....	.....
Nov.	22.70	49.07	27.01	58.11	.....	.....
Dec.	22.21	48.03	25.73	55.375	.....	.....
Year	24.09	52.16	24.75	53.57	.....	.....

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Company.	—Latest Dividend.— Payable.	Rate.	Total.	Total to date.
†Calumet & Ariz.	Sept. 20	$1.50	$300,000	$1,800,000
Calumet & Hecla	Sept. 27	10.00	1,000,000	86,350,000
†Federal Sm., com	Sept. 15	1.50	78,750	157,500
†Federal Sm., pf.	Sept. 15	1.75	183,750	735,000
†Gen'l Chem., pf	Oct. 1	1.50	150,000	3,175,178
†Nat'l Lead, pf	Sept. 15	1.75	260,820	14,754,628
Wolverine, Mich	Oct. 1	4.00	240,000	1,770,000

†Quarterly.

ASSESSMENTS.

Company.	Delinquent.	Sale.	Amount.
Allouez, Mich	Sept. 26	.....	$1.50
Alpha Con., Nev	Oct. 3	.....	.05
Belcher, Nev	Sept. 13	Oct. 4	.10
Caledonia, Nev	Aug. 31	Sept. 21	.15
Confidence, Nev	Sept. 19	Oct. 7	.20
Con. New York, Nev	Sept. 13	Oct. 4	.05
Kentuck, Nev	Sept. 8	Sept. 29	.05
Marina Marsicano, Cal.	Sept. 29	Oct. 31	.05
May Day, Utah	Aug. 31	Sept. 24	.01½
Mexican, Nev.	Sept. 12	Oct. 3	.15
Mohican, Cal.	Oct. 15	.....	.10
Mt. Pleasant Con., Cal	Sept. 12	.....	.03
New Bunker Hill, Cal.	Sept. 19	.....	.06
Orleans Con., Cal.	Sept. 15	Oct. 31	.07½
San Domingo, Cal.	Sept. 27	.....	.25
Savage, Nev.	Oct. 5	Oct. 26	.10
Seg. Belcher & Mides, Nev	Aug. 30	Sept. 19	.05
Sierra Nevada	Sept. 1	Sept. 21	.10
Socrates, Cal	Sept. 14	.....	.02
Utah Con., Nev	Sept. 10	Oct. 3	.05
Yellow Jacket, Nev	Sept. 22	Oct. 27	.10

STOCK QUOTATIONS

NEW YORK.

Company.	Par val.	Aug. 31 H.	Aug. 31 L.	Sept. 1 H.	Sept. 1 L.	Sept. 2 H.	Sept. 2 L.	Sept. 3* H.	Sept. 3* L.	Sept. 5* H.	Sept. 5* L.	Sept. 6 H.	Sept. 6 L.	Sales.
Alta	$1	.12												500
Amalgamated	100	57½	56½	57⅞	56½	58½	56¼					58	57⅛	69,735
Anaconda C	25			.80		80½	80					80½	8	2,100
Anaconda, G	5											.10		500
Andes	1													
Belcher	3											.22		100
Best & Belcher	3													
Brunswick	1	.18		.19		.18								1,400
Bullion s	1	.32				25								800
Caledonia	1	*												
Chollar	2½					.14								200
Con.Cal.& Va	3			1.10										200
Con. Imperial	2½													
Cripple CreekCon	1			10								.10		1,500
Crown Point	1			16	.15									700
Elkton	1	.65		.65	.64							.65		200
Gold Dollar	1					.06								400
Gould & Curry	1													
Greene Con	10	14¼	14¼	14¼	14¼	14¼	14¼					14¼		4,900
Hale & Norcross	3													
Homestake	100													
Horn Silver	20					1.65								600
Iron Silver	20											2.05	2.00	250
Isabella	1	.22	.21											1,500
Julia s	1											.09		400
Justice	2											.11	.10	600
Leadville	10													
Little Chief	50					.06								100
Mexican	3					.85						.86		200
Mollie Gibson	5													
Moon Anchor	3			.08		.08								1 000
Occidental	3											.80		100
Old Gold g	1	.10				.11								2,000
Ophir	5	2.40				2.50								1,400
Overman s	2											.20		200
Pharmacist	1					.04						.03½		1,500
Phoenix	1					.17	.14							4,800
Portland	1			1.65										100
Potosi	1			.15										400
Savage	3			.23	.22									400
Sierra Nevada	3			.34										300
Standard Con	10													
Tennessee	25	29½												75
Union Cor	1													
Union Copper	10	1/16		1/16		1/16	1/16					1	1/16	1,670
United Cp. Com	100	9½	9											200
White Knob	10			3½	3½	3½	3½							815
Work	1	.10		.9										1,000
Yellow Jacket	1													

*Holiday. Total sales, 102,845 shares.

COAL, IRON AND INDUSTRIAL STOCKS.

Company	Par val.	Aug. 31 H.	Aug. 31 L.	Sept. 1 H.	Sept. 1 L.	Sept. 2 H.	Sept. 2 L.	Sept. 3† H.	Sept. 3† L.	Sept. 5† H.	Sept. 5† L.	Sept. 6 H.	Sept. 6 L.	Sales.
Allis-Chalmers	$100					10								50
Preferred	100					50								600
Am. Agr. Chem.	100													
Preferred	100													
Am. Sm. & Ref	100	64⅛	63	64⅛	64	65⅞	64½					65⅛	65⅛	26,563
Preferred	100	107½	106½	107	106½	107	106½					107⅛	107	2,795
Col. Fuel & I	100	37½	36½	36½		36⅛						37	36⅛	1,200
Preferred	100													
Col. & H. C. & I.	100			12½		12½	12⅛					12½	12½	470
Crucible Steel	100	5⅛		5⅛		5⅛						5⅛		395
Preferred	100	37½	37½	37½	37⅛							38	37½	440
General Chemical	100													
Preferred	100													
Mong. R. Coal	50													
Preferred	50	21										22		250
National Lead	100	23⅛	22½	23½		23⅛	23⅛					23⅛	23⅛	5,200
Preferred	100			96	95½	95½						96		700
Phila. Nat. Gas	100													
Preferred	100					44½						44½		150
Pittsburg Coal	100													
Preferred	100	57⅛	57	58⅛	57	57⅛	57½					58⅛	58	1,316
Republic I. & S.	100	7½		7⅛	7⅛	7⅛						7⅛	7⅛	3,540
Preferred	100	44	43½	44½	44	44⅛	43½					42½		6,515
Sloss-Shef.S &I	100	38										37½		200
Preferred	100	87	86½			87								400
Standard Oil	100			627½		628½	628					630½	630	67
Tenn.C.I.&R.R.	100	45½	44⅛	45½	44⅛	45½	45					45⅛	44⅛	9,660
U.S.Steel Corp	100	12⅞	12⅛	13½	12⅛	13⅞	13½					14	13⅛	95,455
Preferred	100	61⅞	60⅛	63	61⅛	63⅛	62⅛					63	61⅛	242,811
Va.-Car Chem	100	33	32⅛	32½		32⅛	32					34	32½	9,280
Preferred	100	107⅛	106½	107⅛	106½	107	106½					107⅛	106⅛	3,810

*Pittsburg Exchange; all others, New York Stock Exchange †Holiday.
Total sales, 411,867 shares.

SAN FRANCISCO.*

Company.	Location.	Aug. 25 H.	Aug. 25 L.	Aug. 26 H.	Aug. 26 L.	Aug. 27 H.	Aug. 27 L.	Aug. 29 H.	Aug. 29 L.	Aug. 30 H.	Aug. 30 L.	Aug. 31 H	Aug. 31 L.	Sales
Golden Anchor	Nev.													
MacNamara	Nev.	.42	.41	.43	.41			.41		.40				3,950
Mont. Tonopah	Nev.	2.30		2.35	2.30	2.35	2.30	2.30	2.25	227½	2.25	2.25		5,450
Ton. Belmont	Nev.	.60		.60						.62	.61			1,300
Ton. Midway	Nev.	.42	.41	.41	.40	.41	.40	.43	.37	.41	.40	.41		19,353
Ton. Mg. Co.	Nev.	8.00								787½				125
Ton. North Star	Nev.	.25				.27				.27				3,300

* San Francisco & Tonopah Exchange. Total sales, 33,478 shares.

SAN FRANCISCO (By Telegraph.)

Company	September 5*	September 6	Company	September 5*	September 6
Belcher		$0.26	Gould & Curry		$0 23
Best & Belcher		1.10	Hale & Norcross		.63
Caledonia		.67	Mexican		.99
Challenge Con		.20	Ophir		2.25
Chollar		.14	Overman		.24
Confidence		.65	Sierra Nevada		.54
Con. California & Virginia		1.05	Union Con		.59
Crown Point		.17	Yellow Jacket		.19

* Holiday.

BOSTON, MASS.

Company.	Par val.	Aug. 31 H.	Aug. 31 L.	Sept. 1 H.	Sept. 1 L.	Sept. 2 H.	Sept. 2 L.	Sept. 3† H.	Sept. 3† L.	Sept. 5† H.	Sept. 5† L.	Sept. 6 H.	Sept. 6 L.	Sales.
Adventure Con	$25	1¼	1½	1¼	1½	1¼	1½					2	1¼	875
Allouez	25	13½	12	13	12½	13½	12¼					13¼	13	6,540
Amalgamated	100	57½	56¼	57½	56¼	58½	57					58	57½	8,670
American Zinc	25			13		12½								45
Anaconda	25			20	19½									15
Arcadian	25	1										90	85	160
Arnold	25													
Atlantic	25	14½	13	13¼	13	14¼	13½					14½	14	3,295
Bingham Con	50	27	26½			27						28½	27	3,780
Bonanza	10											55	50	300
Boston Con	5	7⅛	7 1/16	7⅛	7⅛	7⅛	7⅛					7⅛	7½	12,685
Calumet & Hecla	25	522	520	520		520	510							74
Centennial	25	28½	27½	28½	27½	29	28					28½	27½	4,760
Central Oil	25													
Con. Mercur	5	30	25	28		28						30		700
Cont. Zinc	25													
Copper Range	100	57⅛	56	57⅛	56	58⅛	57½					58	57½	8,716
Daly-West	20	13⅛		14¼	13½	14¼	14					14¼		1,170
Dominion Coal	100			56½	55½	60	57½					62	61	825
Preferred	100					107½	106½							10
Dominion I.& S	100	11		11		12	11½					12		835
Elm River	12	3		2½		3	2½					2½		365
Franklin	25	9		9		9½	9					9½	9	828
Granby Con	10	3½	3⅜	3½		3½						3½	3⅜	6,720
Guanajuato Con	5			1½		1½						1⅜		300
Isle Royal Con	25	20½	19	19½	19	20½	19½					20	18½	9,426
Mass Con	25	3½	3⅜	3½		3½						3½	3½	610
Mayflower	25													
Michigan	25	5½		5½	5⅜	5½	5⅜					5½		780
Mohawk	25	45⅛	45	45½	44½	46⅛	45					47⅛	45½	2,462
Mont. Coal & C.	25	6⅜	6	6½	6	6⅜	6					6½	6	6,195
Mont. & Boston	5											1⅛	1½	600
New Idria, Q'sil	5													
Old Colony	25	1				1								300
Old Dominion	25	15½	14½	15⅛	15	16½	15½					16½	15⅛	3,577
Osceola	25	72	71	72	71	76⅛	71⅛					78	75	3,226
Parrot	10	25½	25	24		25½	24					25½	25⅛	634
Phœnix Con	25	100	90c			2½	2⅛					2⅜	2½	2,000
Quincy	25	87		87		88½	86½					90	88	242
Rhode Island	25	75		80										165
Santa Fe	10	1⅜		1⅜								1⅜		300
Shannon	10	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛					4⅛	4⅛	9,780
Tamarack	25	110	107	110	108½	120	114					120	118	490
Trinity	25	7⅞	7⅜	7½	7⅛	7½	7⅛					7½	7⅛	1,125
Union	25													
United States	10	22½	21⅜	22	21½	21⅜	21					21⅜	20⅛	6,520
U.S.Coal & Oil	25	12½	11⅛	11½		12								6,026
Utah Con	5	42⅛	42	42½	42	42⅜	42					43½	42⅜	9,764
Victoria	25	3⅜	3⅛	3⅜								3 1/16	3⅛	550
Winona	25	10½	9½	9⅜	9½	10	9⅛					10	9½	1,120
Wolverine	25	86½	86	88½	86	93	88½					93	92	899
Wyandot	25	1½	1	1½	1	1						1		3,920

†Holiday. Total sales, 132,379 shares.

COLORADO SPRINGS, COLO.

Company.	Par val.	Aug. 27 H.	Aug. 27 L.	Aug. 29 H.	Aug. 29 L.	Aug. 30 H.	Aug. 30 L.	Aug. 31 H	Aug. 31 L.	Sept. 1 H.	Sept. 1 L.	Sept. 2 H	Sept. 2 L.	Sales.
Acacia	$1	.06½	.05⅞	.06½	.05⅞	.06½	.06	.06½	.06	.06½	.06	.06½	.06	2,000
Anaconda	5	.11½	.11	.11½	.11⅜	.11½	.11	.11½	.11	.11½	.11	.11½		
Colo. City & M.	1	.007		.007				.007		.01½	.007	.007		
C. K. & N.	1	.40	.34	.37	.35	.36	.33	.35	.33	.35	.33½	.36	.32½	
Cripple Ck. Con	1	.09½	.09½	.09⅜	.09½	.09½	.09½	.09⅜	.09	.09½	.09	.09½	.09	21,500
Des Moines	1	.02	.01½	.02	.01½	.02	.01½	.02	.01½	.02	.01½	.02	.01½	
Doctor-Jack Pot	1	.04½	.04	.04½	.04	.04⅜	.04	.04⅜	.04¼	.04⅜	.04¼	.04⅜	.04¼	1,000
Elkton Con	1	.65	.64⅜	.64⅜	.64½	.65½	.65	.65½	.65	.65½	.65	.65½	.64½	12,700
El Paso	1	.95	.94½	.93½		.94½	.94¼	.94½	.94¼	.94½	.94¼	.94	.93½	11,972
Gold Dollar Con	1	.06¾	.06½	.06⅞	.06⅝	.06⅞	.06⅝	.06⅞	.06¾	.06⅞	.06¾	.07	.06½	28,850
Gold Sovereign	1	.06	.05½	.05½	.05½	.05½	.05½	.05½	.05½	.05½	.05½	.05½	.05½	4,000
Golden Cycle	1	.45	.40	.45	.40	.45	.40	.45	.40	.45	.40	.45	.40	
Hart	1	.04	.02	.04	.02	.04	.02	.04	.02	.04	.02	.04	.02	
Isabella	1	.21½	.21	.21		.21½		.22	.21	.25⅜		.21½	.21½	11,000
Jack Pot	1	.06	.05	.05	.03	.04½	.03½	.05	.03½	.05	.03	.04	.03½	500
Keystone	1	.05	.04½	.05	.04½	.05	.04½	.05	.04½	.05	.04½	.05	.04½	6,000
Last Dollar	1	.40		.40		.40		.40		.40		.40		
Lexington	1	.03⅝	.03½	.03⅝	.03½	.03⅝	.03½	.03⅝	.03½	.03⅝	.03½	.03⅝	.03½	6,000
Little Puck	1	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜	.03½	17,000
Mollie Gibson	1	.04½	.04	.04½	.04½	.04½	.04½	.04½	.04	.04½	.04	.04½		
Moon-Anchor	5	.07½	.07	.07½	.06½	.08	.07	.08	.07	.08½	.07	.07½	.06⅝	1,000
New Haven	5	.03½	.03	.03½	.02½	.03½	.02½	.03½	.02½	.03½	.03	.03½	.03½	18,000
Old Gold	1	.11	.10½			.10½	.09½	.10½	.09½	.10⅜	.09½	.10	.09½	45,000
Pharmacist	1	.03⅜	.03½	.02		.03½	.03⅜	.03½	.03½	.03½	.03½	.03½	.03⅜	15,000
Portland	1	1.65	1.60	1.65	1.60	1.70	1.60	1.70	1.60	1.70	1.60	1.70	1.60	
Vindicator Con	1	.69	.60	.69	.61	.69	.61½	.69	.61	.67	.62	.68	.60	
Work	1	.09½	.08⅜	.09⅜	.08⅞	.09½	.09	.09½	.09	.10	.09	.09	.08⅞	7,000

Total sales, 168,022 shares.

COLORADO SPRINGS (By Telegraph).

Company.	Sept. 5* H.	Sept. 5* L.	Sept. 6 H.	Sept. 6 L.	Company.	Sept. 5* H.	Sept. 5* L.	Sept. 6 H.	Sept. 6 L.
Anaconda			.12	.11	Jack Pot			.03	
Cripple Ck. Con			.09½	.08⅜	Last Dollar			.40	
C. K. & N			.35	.30	Mollie Gibson			.04½	
Doctor Jack Pot			.04½	.04	Moon Anchor			.07½	.06⅜
Elkton Con			.64⅜	.64⅛	Old Gold			.10½	.09⅜
El Paso			.96	.94⅞	Pharmacist			.03½	.03½
Gold Dollar			.07½	.07	Portland			1.70	1.61
Gold Sovereign			.05⅞	.05⅜	Vindicator Con				
Isabella			.21½	.21	Work			.09½	.09

* Holiday.

PHILADELPHIA, PA.

Company.	Par val.	Aug. 31 H.	Aug. 31 L.	Sept. 1 H.	Sept. 1 L.	Sept. 2 H.	Sept. 2 L.	Sept. 3† H.	Sept. 3† L.	Sept. 5† H.	Sept. 5† L.	Sept. 6 H.	Sept. 6 L.	Sales.
Cambria Iron	$50					47½						47½		16
Cambria Steel	50	19½	19½	20	19½	20½	20					20½	20½	2,305
Int.Smokel'sPwd	100			17½										100
Preferred	100													
Lehigh C. & N.	50	82	81½	81½	81½							81½	81½	260
Mont. Tonopah	1			2.32								2.10		
Philadelphia	50			39½	39½	41	39½					40½	40½	6,675
Preferred	50			44½	44½	44½						44½		92
Tonopah	100											7.50		
Tonopah-Belm't	1													
United Gas	50	90½	89½	89½	89½	89½	89½					90½	89½	1,364
Westmoreland C	50													

Total sales, 10,812 shares. †Holiday.

STOCK QUOTATIONS.

ST. LOUIS, MO.*

Sept. 3

Company	Par Val	Bid	Ask	Company	Par Val	Bid	Ask.
Am. Nettie, Colo	$10	$0.15	$0.25	Columbia Lead, Mo	$10	$0.25	$1.00
Catherine Lead, Mo.	10	1.00	2 00	Con. Coal, Ill.	100	14.00	15.50
Central Coal & C.	100	63.00	65.00	Doe Run Lead, Mo	100	110.00	115.00
Central C. & C., Pf.	100	72.00	74.00	Granite, Bimet Mt.	10	.37	.47
Central Lead, Mo.	100	112.00	117.00	St. Joe Lead, Mo	10	14.00	15.00

*By our Special Correspondent.

SALT LAKE CITY.*

Sept. 3

Company	Par Val	High	Low	Sales	Company	Par Val	High	Low	Sales
Ajax	$ 1	$ .07½	$ .07½	500	Mammoth	$ 1	1.57	1.45	600
Beck Tunnel	1	.05½	.05½	2,000	May Day	25	.04½	.01½	48,400
Butler Liberal		.10½	.10	2,250	N.Y.Bonanza	1	.04½	.04½	9,200
Carisa	1	.07½	.07	3,400	Petro	5			
Century	1	.36	.36	500	Sacramento		.04½	.04½	2,700
Columbus Con		1.33	1.22½	4,350	Silver King	5	50.00	50.00	50
Con. Mercur	1	.29½	.28	2,000	Silver Shield	20	.50	.50	50
Daly	20	2.30	2.20	500	Star Con.	1	.15	.14½	6,900
Daly Judge	1	4.60	4.50	150	Tetro	1	.28	.26½	3,800
Daly West	20	13.70	13.40	355	Uncle Sam, Con	1	.21½	.21½	3,000
Golden Eagle	20				Yankee Con	1	.34½	.35½	700
Goldfield Bon		5	5	3,500					

*By our Special Correspondent. Total sales 89,792 shares.

DULUTH, MINN.

Sept. 1

Company	Par Val	Bid	Ask	Company	Par Val	Bid	Ask
Calumet & Arizona	$10	$95.00	$97.00	Lake Sup. & Pitts.	$10	$31.00	$32.50
Calumet & Bisbee	10		2.00	Pitts. & Duluth Dev.	15	27.50	30.00
Calumet & Pittsburg	10	30.00	30.50	Shakespeare	10		.20
Higgins Development	10		1.00	United Mexican	10		.50
Junction Development	15	30.00	31.00	Wolverine & Arizona	10		2.00

MONTREAL.*

Sept. 2

Company	Par Val	High	Low	Sales	Company	Par Val	High	Low	Sales
Dominion Coal	100	61.00	52.00	1,135	Montreal Steel	100	40.00	35.00	
Dom. Coal, Pf.	100				Mont'l Steel, Pf	100	100.00	75.00	
Dom. I. & St.	100	12.00	10.62½	1,717	Nova Scotia St.	100	65.75	62.00	1,410
Dom. I. & St., Pf	100	38.00	32.00	790	N. S. Steel, Pf	100	105.25		100
Internat'l Coal	100	100.00			Ogilvie	100	200.00	180.00	
Int'l Coal, Pf	100	100.00			Ogilvie, Pf	100	123.00	117.00	

*Montreal Stock Exchange. Total sales, 3,088 shares.

MEXICO.

Aug. 26

Company	Shares Issued	Prices, Mex. Bid.	Ask.	Company	Shares Issued	Prices, Mex. Bid.	Ask.
DURANGO:				San Rafael y An., aviada	1,200	$725	$735
Ca. Min de Penoles	2,500	$2,700	$3,200	Soledad, aviada	670	940	945
San Andres de la Sierra	200	10,000		Sorpresa, aviada	960	300	305
GUANAJUATO:				MEXICO:			
Angustias, Pozos	2,400	30	34	Alacran	2,400	20	28
Cinco Senores y An. aviadoras	2,000	33	35	Aldebarren	2,000	50	54
Cinco, Senores y An. aviada	400	33	35	Buen Despacho	3,000	58	62
Providencia, San Juan de la Luz	6,000	50	52	Dos Estrellas	3,000	1,905	1,940
Queensland y Australia	300	8	12	La Esperanza (El Oro.)	3,000	1,500	1,500
GUERRERO:				La Reforma, aviadores	2,000	28	32
Delfina, 1st serie	2,500	30	35	Santa Ana, Esperanza	2,400	60	80
Delfina, 2nd serie	2,500	25	30	MICHOACAN:			
Garduno y Anexas	7,200	35	40	Luz de Borda, aviadora	3,000	10	13
HIDALGO:				Luz de Borda, aviado	1,000	10	15
Amistad y Concordia	9,600	73	76	Santiago y An., Tlal.	4,000	7	10
Carmen, aviada	1,100	100	125	NUEVO LEON:			
Guadalupe Fresnillo Mill	1,000	170	200	La Fraternal	1,000	580	620
Guadalupe Fresnillo Minc	1,400	70	80	Norias de Bajan	1,000	880	920
La Reina y An., aviadora	5,600	3½	5	SAN LUIS POTOSI:			
Luz de Maravillas, aviadas	1,100	...	20	Concepcion y An	3,000	52	58
Maravillas y An., aviador	1,680	110	150	El Barreno, aviadora	2,000	82	84
Maravillas el Lobo	1,000	130	180	Sta. Maria de la Paz	9,600	199	203
Palma y An., aviador	1,800	4	8	San Diegoy Annexas	2,400	6	10
Refugio, aviada	12,800	680	740	ZACATECAS:			
Santa Anay An., aviadora	800	50	70	Asturiana y An	2,500	20	25
Santa Anay An., aviada	600	25	35	Candelaria y Pinos	2,500	16	20
Sta. Gertrudis y An aviadas	9,600	12	14	Esperanza y An	2,400	6	8
Sta Gertrudis y An. aviadora	28,800	77	79	Lourdes	2,500	21	25
Santo Tomas Apostol aviadoras	5,100	2	3	Luz de Minillas, pagadoras	2,000		
San Felipe de Jesus aviadora	3,600	13	15	Nueva Quebradilla, aviadoras	2,400	16	25
San Felipe de Jesus aviada	1,200	5	6	Nueva Quebradilla, aviadas	600	20	30
San Rafael y An., Trompillo	1,200	1,950	1,980	San Carlos y Annexas	2,500	35	40
				Sta. Maria de Gaud.	2,500	90	105
				MISCELLANEOUS			
				Bartolome de Medina	2,000	99	100
				Naica (Chihuahua)	100	11,000	13,000
				Natividad (Oaxaca) aviadora	1,800	950	1,000
				San Francisco Hac	6,000	95	98
				Union Hacienda	3,000	325	360

LONDON.

Aug. 26

Company.	Shares Issued.	Par value.	Latest dividend. Amt.	Date.	Quotations. Buyers.	Sellers.
		£. s. d.	s. d.		£. s. d.	£. s. d.
American:						
Alaska-Treadwell	200,000	5 0 0	2 0	July, 1904	4 10 0	4 15 0
Anaconda	1,200,000	5 0 0	2 0	May, 1904	3 18 9	4 1 3
Camp Bird	820,000	1 0 0	9	Aug., 1904	1 8 6	1 9 6
Copiapo	112,500	2 0 0	6 10	May, 1903	1 0 0	1 5 0
De Lamar	80,000	1 0 0	1 6	May, 1904	13 9	16 3
El Oro	1,080,000	1 0 0	9	July, 1904	1 1 3	1 3 9
Esperanza	455,000	1 0 0	6	Aug., 1904		
Frontino & Bolivia	128,662	1 0 0	3 0	July, 1901	8 0	10 0
Le Roi	200,000	5 0 0	5 0	Nov., 1899	13 9	16 3
Le Roi No. 2	120,000	5 0 0	1 0	June, 1904	10 0	12 6
Palmarejo & Mexican	445,000	1 0 0	rts.	Apr., 1903	8 0	8 6
Standard	500,000	4 0	2½	Sept., 1903	2 0	3 0
Stratton's Independence	1,000,007	1 0 0	6	Dec., 1903	1 9	2 3
St. John del Rey	546,265	1 0 0	6	Dec., 1903	10 0	11 0
Tomboy	300,000	1 0 0	1 0	June, 1902	1 0 0	1 5 0
Ymir	200,000	1 0 0	1 0	Mar., 1902	2 6	5 0
European:						
Linares	15,000	3 0 0	5 0	Apr., 1904	3 5 0	3 15 0
Mason & Barry	185,172	1 0 0	7 0	May, 1904	2 17 6	3 2 6
Rio Tinto	325,000	5 0 0	37 6	May, 1904	53 17 6	54 2 6
Rio Tinto, preferred	325,000	5 0 0	2 6	May, 1904	6 0 0	6 5 0
Tharsis	625,000	2 0 0	7 0	May, 1904	4 5 0	4 10 0
West Australian:						
Associated	495,388	1 0 0	2 6	July, 1904	2 2 6	2 5 0
Cosmopolitan	400,000	1 0 0	1 0	Apr., 1904	7 3	7 9
Golden Horseshoe	300,000	5 0 0	6 0	Aug., 1904	7 0 0	7 2 6
Great Boulder	1,750,000	2 0	9	Sept., 1904	1 1 0	1 1 6
Gt. Boulder Persever'ce	1,400,007	1 0 0	1 0	Sept., 1904	13 0	13 6
Great Fingall	250,000	1 0 0	7 0	July, 1904	7 11 3	7 13 9
Ivanhoe	200,000	5 0 0	5 0	July, 1904	7 6 3	7 8 9
Kalgurli	120,000	1 0 0	2 6	July, 1904	5 3 9	5 6 3
Lake View	250,000	1 0 0	rts.	Aug., 1902	1 1 3	1 3 9
Oroya-Brownhill	450,000	1 0 0	3 0	Sept., 1904	3 5 0	3 7 6
Miscellaneous:						
Brilliant Central	100,000	1 0 0	1 0	Sept., 1904	2 5 0	2 10 0
Briseis	600,000	1 0 0			8 6	9 0
Broken Hill	960,000	8 0	1 0	Aug., 1904	2 1 6	2 2 6
Mt. Lyell	275,000	3 0 0	1 3	June, 1904	13 0	13 6
Mt. Morgan	1,000,000	1 0 0	3	Aug., 1904	1 18 9	2 1 3
Waihi	497,412	1 0 0	2 6	Sept., 1904	5 11 3	5 13 9
Indian:						
Champion Reef	513,832	10 0	1 4	Sept., 1904	1 12 0	1 13 0
Mysore	566,043	10 0	4 6	July, 1904	6 8 9	6 11 3
Nundydroog	484,000	10 0	1 3	July, 1904	1 11 3	1 13 9
Ooregum	343,000	10 0	1 3	Aug., 1904	17 0	18 0
Ooregum, pfd.	240,000	10 0	4	Aug., 1904	1 8 9	1 11 3
South African:						
Angelo	600,000	1 0 0	7 0	Aug., 1904	6 17 6	7 0 0
Bonanza	200,000	1 0 0	8 0	Aug., 1904	1 1 3	1 3 9
British South Africa	4,436,019	1 0 0	rts.	May, 1899	1 11 1	1 12 3
Cape Copper	300,000	2 0 0	2 6	July, 1904	3 3 9	3 6 3
Cape Copper, pfd.	75,000	2 0 0	2 6	July, 1904	3 2 6	3 7 6
City & Suburban	340,000	4 0 0	4 0	Aug., 1904	5 13 9	5 16 3
Consol. Gold-Fields	2,000,000	1 0 0			6 2 6	6 5 0
Crown Reef	120,000	1 0 0	6 0	Aug., 1904	14 5 0	14 15 0
De Beers, preferred	800,000	2 10 0	10 0	Aug., 1904	18 8 9	18 11 3
De Beers, deferred	1,000,000	2 10 0	12 6	Aug., 1904	18 11 3	18 13 9
East Rand	990,000	1 0 0	5 0	July, 1903	8 1 3	8 2 6
Ferreira	90,000	1 0 0	22 6	Aug., 1904	20 5 0	20 15 0
Geldenhuis	200,000	1 0 0	7 0	Aug., 1904	5 6 3	5 8 9
Geduld	400,000	1 0 0	rts.	Mar., 1902	6 7 6	6 8 9
Henry Nourse	125,000	1 0 0	8 0	Aug., 1904	8 2 6	8 7 6
Jubilee	50,000	1 0 0	5 0	Aug., 1904	4 12 6	4 17 6
Jumpers	100,000	1 0 0	2 6	May, 1904	2 15 0	3 0 0
Langlaagte	470,000	1 0 0	2 0	Aug., 1904	3 11 3	3 13 9
May	288,750	1 0 0	3 0	Aug., 1904	3 17 6	4 0 0
Meyer & Charlton	100,000	1 0 0	5 0	Aug., 1904	5 7 6	5 12 6
Modderfontein	290,000	1 0 0	rts.	Apr., 1902	8 13 9	8 16 3
Namaqua	94,331	2 0 0	3 0	Dec., 1903	2 15 0	3 0 0
New Jagersfontein	200,000	5 0 0	10 0	June, 1904	27 5 0	27 15 0
New Primrose	325,000	1 0 0	3 0	Aug., 1904	3 13 9	3 16 3
Rand	1,795,956	5 0 0	5 0	Aug., 1902	10 2 6	10 5 0
Robinson	750,000	5 0 0	6 0	Aug., 1904	9 0 0	9 5 0
Robinson Deep	950,000	1 0 0	3 0	Aug., 1904	5 7 6	5 10 0
Rose Deep	425,000	1 0 0	3 0	Aug., 1904	8 12 6	8 17 6
Salisbury	100,000	1 0 0	2 0	Sept., 1904	1 10 0	1 15 0
Village Main Reef	400,000	1 0 0	4 0	July, 1904	6 7 6	6 12 6
Wemmer	80,000	1 0 0	12 6	July, 1904	10 10 0	11 0 0

LONDON (By Cable.)*

Company	Aug. 31 £	s.	d.	Sept. 7 £	s.	d.	Company	Aug. 31 £	s.	d.	Sept. 7 £	s.	d.
Camp Bird	1	9	6	1	9	0	Esperanza		19	3		19	0
Con. Gold Fields	6	5	0	6	6	3	Modderfontein	8	15	0	9	1	3
De Beers	18	15	0	18	17	6	Rand Mines	10	3	9	10	6	3
Dolores	1	1	6	1	2	6	Rio Tinto	54	2	6	55	2	6
East Rand	8	1	10	8	4	4½	Simmer & Jack	1	13	9	1	13	1½
El Oro	1	3	1½	1	2	6	Tomboy	1	2	6	1	2	0

*Furnished by Wm. P Bonbright & Co., 15 Wall St., New York

PARIS.

Aug. 18.

Company.	Location.	Capital Stock.	Par value.	Latest dividend	Prices. Opening	Closing
		Francs.	Fr.	Fr.	Fr.	Fr.
Anzin, Coal	France			290.00	5,650.00	5,690.00
Boleo, c	Lower Cal.	12,000,000	500	104.17	1,940.00	2,019.00
Champ d'Or, g	S. Africa	3,375,000	25	3.75	16.50	17.50
Courrieres, Coal	France	600,000	500	110.00	2,890.00	2,889.00
Fraser River, g	Brit. Col.	250,000	25		5.50	5.50
Huanchaca, s	Bolivia	40,000,000	125	2.50	95.25	95.75
Laurium, z. l	Greece	16,300,000	500	25.00	300.00	300.00
Malfidano, z	Italy	12,500,000	500	50.00	590.00	595.00
Metaux, Cie. Fran. de	France	25,000,000	500	22.50	481.00	485.00
Mokta-el-Hadid, i. l	Algeria	18,312,000	500	40.00	925.00	945.00
Nickel, n	N. Caledonia	15,000,000	250	22.50	556.00	555.00
Penarroya, Coal	Spain		500	45.00	1,064.00	1,060.00
Vielle Montagne z	Belgium	9,000,000	30	30.00	719.00	721.00

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. o—Oil. s—Silver. z—Zinc.